The Iron Age

A Review of the Hardware and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 10 Warren Street, New York.

Vol. XV: No. 25. *New York, Thursday, June 24, 1875.* *$4·50 a Year, Including Postage. Single Copies, Ten Cents.*

Monitor Surface Planer.

This is a small compact machine, especially adapted for use by builders, box and pattern makers and others requiring a parallel planer. It will surface hard or soft wood from one-eighth to 6 inches thick and 24 inches wide, and in quantity from 10,000 to 20,000 feet per day. The frame is of the box pattern, which is altogether the best for work of this kind, being very much stronger, stiffer and neater than the rib frames often employed. It is a casting in a single piece, and gives the best possible support not only to the machine but to the work. This style has come to be recognized among builders as the best form for frames of all kinds. Richards, in his work upon wood-working machinery, places this style of framing ahead of all others, giving it his unqualified approval, and, if we are not mistaken, is now adopted by all the best manufacturers in the country.

The machine has 4 idler rolls and 2 driven rolls, all of wrought iron, and adjustable to take up wear. The 2 driven feed rolls are in close proximity to the cutter cylinder, the distance being only 7⅝ inches, so that short and long stuff may be planed without clipping the ends. The upper feed rolls are held down by strong spiral springs. They are securities to the unevenness of the material, and are strong and act quickly. An adjustable roller scraper is attached to the back feed roller, to keep it free from going matter. The feed can be instantly stopped or started, or the material returned, if desired. The cutter cylinder has long journals ground to fit, mounted in self-oiling bearings, which are lined with a first-class anti-friction metal. The journal boxes form the upper part of the adjustable slides, which are made very strong. The slides move in long, gibbed bearings, giving means for adjustment in case of wear, while a hand wheel gives means of raising or lowering the cylinder. The cylinder can be raised or lowered while in motion or at rest. A graduated scale is attached to the slides to show the distance between the table and cutter cylinder. The cylinder bonnet can be quickly swung for the purpose of sharpening the knives. The gearing bonnet lifts off when it is desired to oil the parts.

The manufacturers are Messrs. Bentel, Margedant & Co., of Hamilton, Ohio, who claim that this is the best machine of its size and lowest in price of any in the market. The machine appears to be strictly first-class, and admirably suited to the use of pattern makers and of that class of wood workers.

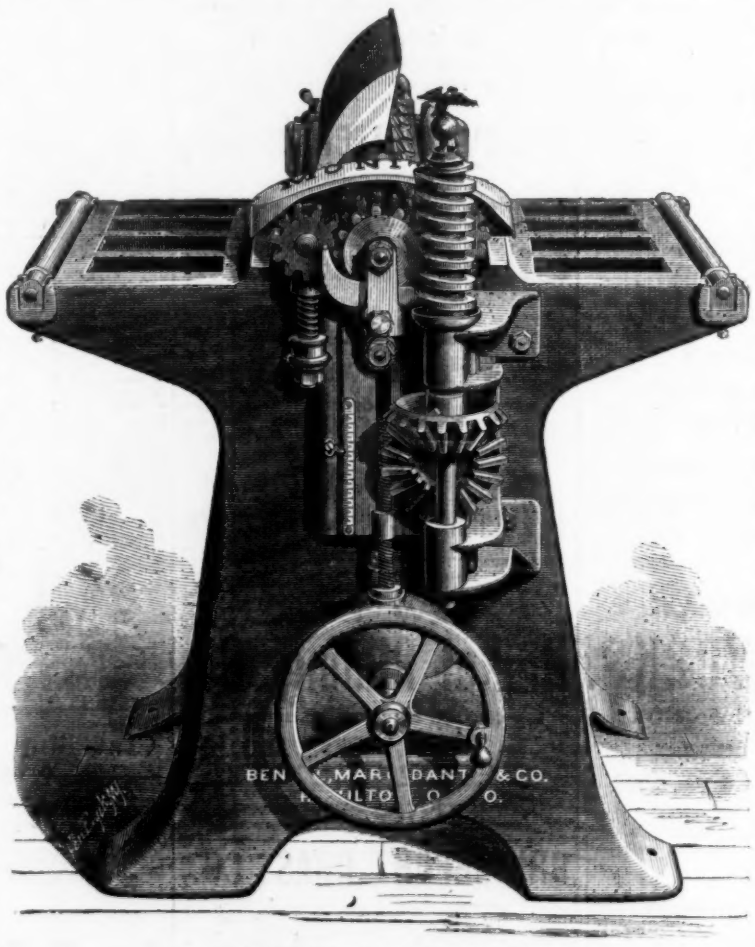
The points we have given will enable any one familiar with wood-working machines to judge for themselves as to the character of this little planer. To those who wish to buy and are not experts we would suggest the perusal of the chapter on Parallel Planing Machines in J. Richards' work on wood-working machinery, page 219, in which principles and practice are both illustrated.

British and American Steam Navigation.

A very disappointing report has been issued this week to the proprietors of the Peninsular and Oriental Steam Navigation Company. The directors announce that a profit has been realized for the six months ending March 31, 1875, but that it is not sufficient to give their proprietors an interim dividend. The directors of the time-honored Peninsular and Oriental stand for the moment in the position of that sorely tried personage, the Mother Hubbard of our nursery days, and the Peninsular and Oriental proprietors are reduced to the lamentable plight of Mother Hubbard's remarkable dog. If the shareholders in the Peninsular and Oriental are not exactly boneless, they are, at any rate, dividendless, and the reason is that the post office does not pay enough for the work and labor done for it, while the company has also suffered from a falling off in its Bombay trade and from the great pressure of competition. It has been remarked since the issue of the lugubrious report which the directors published to the world recently, that the Peninsular and Oriental will probably have less to fear in the future in consequence of the announced intention of the French government to withdraw the large subsidy given by it for some years past to the Messageries Maritimes, the steamers of which have competed with the Peninsular and Oriental in the Eastern seas. Peninsular and Oriental shareholders may, perhaps, extract a fragment of consolation from this change in the policy of the French government; but, on the other hand, they are threatened with opposition from another quarter which may possibly give them more trouble.

Thus we learn this week that the Occidental and Oriental Steamship Company of America has dispatched a well-known White Star steamer, the Oceanic, from Liverpool to Hong Kong, where she will take her place in the line to and from San Francisco. The Gaelic and Belgic, nearly new sister ships, will follow her shortly, and will together form a regular monthly line across the North Pacific. These ships, although belonging to an entirely distinct and independent corporation, will be run in co-operation with the vessels of the Pacific Mail Company, making alternate trips with them. The vessels of the new line are of great capacity as well as great speed. It is believed by the promoters of this American undertaking that the time hitherto occupied in the passage between London and the Asiatic ports, via the Pacific Railroad route, will be considerably abridged, a through schedule of 40 days or less being in contemplation for passengers and mails. The Oceanic was dispatched to Chinese waters, so as to be in a position to leave China for San Francisco early in June; and she will be due in San Francisco about July 1 with a cargo of new crop teas, silks, &c., the other ships of the new line being deputed to follow at regular intervals. The through business of the new line, and also of the Pacific mail, will be concentrated upon the Pacific Railroad route. It was to develop the trade of Eastern Asia, and encourage the use of the American overland line for this traffic, that the new organization was started, and it is understood that the Central Pacific and the Union Pacific Railroad Companies are among the chief promoters of the enterprise.

The directors of the Peninsular and Oriental do not allude in their report to this American competition, but although there is a want of stability about all American enterprises, there can, we think, be little doubt that the Pacific Railroad route is growing in importance as a means of communication between Europe and India and China, to say nothing of Australia. With the help of the Sandwich Islands as a half way house, the Americans will certainly develop a large trade between San Francisco and our antipodean colonies. They have not yet directly attacked our carrying trade with India, but they have developed sustained relations with China and Japan. Just as the Direct United States Cable Company has attacked the Anglo-American Telegraph Company, so now Americans seem likely to compete with us for the carrying trade of the Far East.—*London Mining Journal.*



IMPROVED SURFACE PLANING MACHINE.

One hundred years ago the cutting of cast iron was a secret which few men could practice. Cast iron appeared to be most obdurate in its resistance to the cutting instrument. From the circumstance that man's past experience had been acquired in the treatment of wood and the softer metals, which admit a high velocity, the earlier attempts to bore and turn cast iron on a large scale failed, because the force was applied in a wrong condition. As experience was gained, it became apparent that a much slower velocity, combined with greater pressure, was necessary, which entirely overcame the difficulty. On one occasion, Mr. Boulton, in writing to his partner, James Watt, said in effect that the completion of the bore of a cylinder by a new boring bar was most satisfactory, the piston fitted so nicely throughout that there was scarcely room for the insertion of a half-crown at the worst part. In these days of Whitworth tools we can scarcely realize their practical difficulties, which were overcome one by one, through the skill and indomitable perseverance of Wilkison and Murdoch.—*Dr. Anderson on Tools.*

Loss of a Valuable Implement.

The London *Mining Journal* says: In the fifth year of Queen Elizabeth, Stowe in his Chronicle tells us that "Richard Matthews, on Flete Bridge, the first Englishman who attained the perfection of making fine knives and knive hafts, obtained a prohibition against all strangers and others for bringing any knives into England from beyond the seas, which until that time were brought into this land from shippes lading from Flanders and other places; albeit at the time, and for many hundred years before, they were made in divers parts of this kingdome many coarse and uncomely knives; and at this day the best and finest knives in the world are made in London." At the present time large quantities of plantation knives of the commonest description are manufactured on the Continent under the appellation of Dutch knives, which at one time were made in Sheffield under the designation of Malay knives, and having lignum vitæ handles and cast iron blades. The Sheffield workmen called these knives "tormentors," from an idea entertained that they were intended for dirks and for scalping knives, and thousands of casks full used to be sent from the cutlery center. But there are knives and knives. Very different were the knives which old Fuller saw offered in Hallamshire at 1d. each, intended "for the common use of the country people," from the superb specimens of complication cutlery which Messrs. Rodgers exhibit under a glass cover in their show room at Sheffield, and which they displayed at the Great Exhibition of 1851. Further, a great contrast must be presented between the knife which for 10d. Thomas Wild, who in 1626 lived in Crooked Billet-yard, High street, Sheffield, made for Lieut. Felton, and with which Felton stabbed the Duke of Buckingham, and the knife which has just been lost to the King of Portugal, and to the whole art-loving world, by the wreck of the Cadiz. The latter was being sent from Lisbon to the Portuguese Legation in London for exhibiton there, and it was deemed of so much value that it was insured for £7000, a price we can well believe to be within its worth, for it had taken the artist Raphael Dacosta 11 years to carve its silver handle. Thereon had been elaborated a profusion of heads of animals of the chase, and a beautiful and costly work of art was the result. It was not, however, fated to gladden the eyes of even those descendants of the London cutlers who so early as 1417 obtained a charter of incorporation from Henry V., and who have a hall in Cloak lane, and admit freemen on the payment of a livery fine of £10. With numerous other valuable articles, this precious hunting knife of His Majesty Dom Luis I. has gone to the bottom of the sea, off Ushant, and we fear is irrecoverable. Not even the model of the knife is preserved, for that, too, is in the water, and an estimate of the rare beauty of the original can only be founded upon the photographs of the knife that are in this country. Even as men often live to recover business losses, so the King of Portugal, being only 38 years of age, is not too old to become the possessor of a hunting knife which may, perhaps, surpass the one which was his during so short a time. Whether Raphael Dacosta will be the faithful subject to replace this loss is another matter. Our readers, however, cannot but share the regret we feel that so precious a specimen of modern metal work is no longer available for the education of our workers or the delight of our *savans.*

The Reading *Times* says: Between 13,000 and 15,000 tons of first-class anthracite pig iron are now held in store at this place, of an aggregate value of about $400,000. The iron has been obtained from the furnaces throughout the Schuylkill and Lehigh Valley, and considerable of it is held as collateral for money advanced by foreign capitalists. A portion of it is owned by English parties, and a considerable portion by the Pennsylvania Railroad. It will be held until an advance is made in the price of iron, when it will be thrown upon the market.

Spectroscopic Estimation of Phosphorus in Iron and Steel.

Iron, in a note on the paper on this subject read at the last meeting of the Iron and Steel Institute, says: Though the spectroscope affords the most delicate of all tests for the detection of many substances, such as the alkalies and alkaline earths, all efforts to give a quantitative value to its indications have hitherto been unsuccessful. Only quite recently an elaborate investigation aiming at establishing a spectroscopic mode of assaying alloys of the precious metals has resulted in disappointment. Important, then, as is the immediate result to which Sir John Alleyne believes he has attained, the promise which his paper shadows forth is even more fascinating than the decisive success it records. If phosphorus can be estimated by the spetroscope, there seems every reason to hope that, by an extension of the same principles, other elements may be found equally amenable to ocular analysis. The supersession of the monotonous and tedious routine of the laboratory by the picturesque and rapid method of the prism, is, in truth, an alluring prospect, calculated to arouse the enthusiasm of those to whom it has appeared as a practical and scientific deduction from well established facts. For the present, however, the most obvious means to expedite the advent of systematic quantitative analysis by the spectroscope, is to perfect the details of the process in which it has found its first successful application. It has been suggested that it would be desirable to use nitrogen instead of hydrogen in the spark-tube, and the same idea occurred to the author of the paper. He found, however, that in addition to the fact of the complicated spectrum of this gas rendering its use objectionable, he could not obtain nitrogen free from oxygen. But it appears that he did not try the effect of an alkaline solution of pyrogallic acid, by which pure nitrogen could be readily obtained. Of course, if nitrogen were substituted for hydrogen, air could take the place of carbonic acid for the development of the phosphorus lines, which would be a considerable advantage. The mode of introducing the gases into the spark-tube by the recording syphon bottle, is a feature of the apparatus on which the author lays great stress, and is certainly ingenious and effective, if not very novel. By the substitution of mercury for water in the aspirator—so as to obviate the use of an inconveniently long tube—the same simple contrivance may be used as an air pump, by which the gases in the spark-tube may be rarefied or compressed at will. It is possible that by varying the tension of the medium in which the incandescent vapor exists, another means of investigation may be found. Thus, Sir John predicts that the mode of estimating larger quantities of phosphorus than the present scheme provides for, will be disclosed if, as he believes, it is found that the greater the quantity of phosphorus present in a substance the greater will be the power of the characteristic green band to resist extinction by the rarefaction of the gaseous medium.

Seamless Nail Kegs.

The Pittsburgh *Commercial* says:

There was recently organized in this city a corporation, to be known as the Pittsburgh Keg and Barrel Company, to manufacture kegs and barrels under a new patent. The principal office of the company is in the Germania Saving Bank building, on Wood street, corner of Diamond, and the managers are Messrs. C. Meyran, H. Mattulath, Charles Root, Thomas A. Weger; secretary, C. M. Seibert.

Under the new process of manufacture the use of staves is entirely dispensed with, the body of the keg or barrel being made of one piece. The process, as stated above, is covered by a patent, but is quite simple and easily described. The logs are cut into the proper length and thoroughly steamed, and are then put in a kind of lathe; here a "veneering knife" cuts the wood the right thickness for the body of the keg, the sheet rolling from the log under the action of the knife, just as a carpet is unrolled. Another knife cuts the sheets into the lengths required. These are then transferred to a table fitted with goring saws (otherwise called "drunken" or "wabbling saws"), which cut out wedge-shaped gores, in order to give the package the proper bulge when shaped. The sheets now pass through a machine which prepares them to receive the heads, and are then placed in a drying house, where they remain for 48 hours. They are then ready for shipping to the shops. The above described processes are carried on and completed at Delphos, Ohio, a place chosen on account of its contiguity to the supply of timber requisite for the purpose, and where Mr. Charles Root, a practical man, has charge.

From Delphos the sheets are shipped to the cooper shops of the company, on Irwin avenue, Allegheny City, where the further process of manufacture is completed.

The company do not claim that they can undersell all other manufacturers of like goods; but they do claim, and with good show of reason, that they make a stronger and handsomer package for the same money. They have, at present, facilities for turning out 2000 nail kegs per day, and expect to increase this as their trade may require. For the transportation of heavy goods long distances, this new style of keg and barrel has great advantage over the old stave style, as, in case of falling, there is no chance for displacing or breaking staves.

Boilers Lined with Copper.

An Austrian railway engineer has had the idea of protecting the boilers of locomotives against incrustation by means of copper plates. The front and back plates of the bottom of the boiler of an engine were covered with a sheet of copper one millimeter in thickness, the middle plate of the boiler being left unprotected. The engine was worked for two years on a portion of the line of the State railways where the water was of very bad quality. When the tubes were taken out the incrustation was found to be 10 millimeters in thickness on the surface of the iron, and only two to three millimeters thick on the copper plates. The iron was in many places corroded to the depth of 1½ millimeters, while the copper was entirely unaffected, and the iron plate beneath it, when uncovered, looked perfectly new. The particles of incrustation were larger on the iron than on the copper. The cost of the copper covering is stated to be from 250 to 650 fr. per boiler.

Another engineer who examined and reported on the arrangement, says that the duration of the boilers is doubled or tripled by the application of the copper plates, which afford extraordinary security against explosion. The incrustation is much less on copper than on iron or steel, which is porous and slightly oxidized, and consequently the vaporization is more complete, and there is a corresponding saving of fuel. In the construction of a boiler to be lined with copper the iron plates may be of less thickness without risk; the weight of the boiler is thus considerably reduced; and, lastly, the expense for repairs is considerably diminished. We have, however, to consider the galvanic effect of the contact of the two metals, and require reports on other waters less calcareous, but more acid, than the one alluded to above as of "very bad quality."

Utilization of Power.—Mr. F. J. Bramwell said, in his annual address to the Institution of Mechanical Engineers: "Do we, in our applications of power, make as much use of wind, water and waves as we ought, remembering that their power may be transmitted to a distance? Do we resort, to any large extent, to sources of power in nature other than coal? Is it not the fact that mechanical invention has gone back in these matters rather than forward? And do we utilize that primary source of power, the heat of the sun, the current heat from year to year, making the most barren hillsides, as it seems to me we might do, by planting quick-growing trees, which, fostered and matured by the sun, would yield large quantities of wood to be used as fuel for domestic purposes? Are we estimating at their full value the deposits of peat, and are we not tempted to pass by this large store of fuel, because its use is attended with difficulties? Is it not true that we use coal in the most grossly wasteful manner? How much of the fuel goes up the chimneys of our furnaces unconsumed, in the form of visible carbon, or in the worse, because less readily detected, form of invisible carbonic oxide?" In the face of such faults and errors, Mr. Bramwell argues that it is the duty of mechanical engineers, "by precept, practice and example, to do all that lies in their power to cause all to respect and understand the value of that which they have too long lightly treated and grossly abused."

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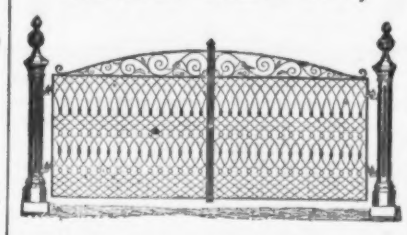

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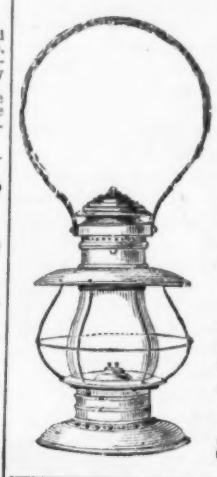

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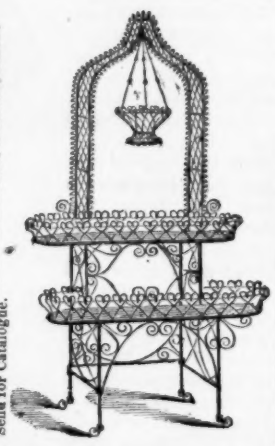

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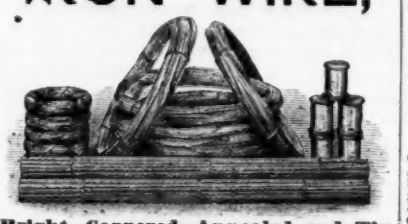

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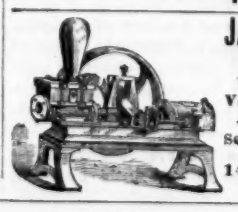

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Notes of Visits to Bridges and Bridge Works.

(Concluded)

ST. CHARLES RAILROAD BRIDGE ACROSS THE MISSOURI AT 20 MILES FROM ST. LOUIS. (*Visited 10th November*, 1873.—This bridge, which is remarkable on account of the difficulty of its foundations, was designed and constructed by Mr. C. Shaler Smith. It has seven spans; four "trellis" or "double triangular girder truss," of 330 feet each, and three Fink "deck" trusses of 305 feet each. The rails are 90 feet above low water, or 51 feet above the extraordinary high water mark of 1844. The track is single, without footways, and there are no "draws."

There are eight river piers, and the foundations of six of them presented new and extraordinary difficulties of construction, owing to the existence of a bed of boulders below a shifting sandy bottom, to the sudden rising of the water, to the great velocity of the current at times of flood, and to the immense fields of ice which float down at the end of the winter season. Nos. 1 and 2 piers were founded easily on the rock at low water. No. 3 pier was founded in 23 feet of water at ordinary water stage. A wooden caisson without a floor was sunk on the site, the decomposed limestone within it was excavated by divers till solid rock was reached, and the crater was filled with concrete and two courses of stone laid upon it. The foundation was then ready for pumping out the water; but the river suddenly rose 26 feet, and crushed the caisson. On the subsidence of the river, the foundation proving uninjured, the pier was built on a caisson boat and sunk on the spot. No. 5 pier.—The rock was here 68 feet from the surface. The compressed air system was, in sinking the foundation, combined with Eads' sand pump and air lock at the bottom of the caisson, and a peculiar "boulder shaft," with a separate lock, was designed to get rid of the boulders. Piers 6, 7 and 8 are alike in the character of their foundations. Inside a circle of piles a caisson was sunk about 30 feet by dredging, and stones were pitched round the piling as the caisson sank. This was continued till stone began to appear in the dredger buckets, which was a sign that the "rip-rap" had begun to pass beneath the piles. When this took place, dredging was stopped, and bearing piles were driven down to the rock and cut off at the level of the bottom of the caisson. The pier was then lowered on the top of the pile-heads, and the caisson being filled with stones, the foundation was complete.

The superstructure was erected on three temporary piers of piling, protected by cribwork, under each river span. On these supports Howe truss spans, 80 feet in length, were placed; and from this foundation sprang the "false work" or centering on which the iron superstructure was put together.

The approaches of the bridge are upon forty iron tressels, and, including these tressels, the bridge is 6570 feet long. Its entire cost was about £2,250,000, or double the original estimate. This excess was due to the great and unforseen difficulties encountered in constructing the foundations.

ST. LOUIS BRIDGE. (*Visited November*, 1873).—The Mississippi at St. Louis is confined to a single channel, 1600 feet wide and 8 feet deep at extreme low water, by an embankment or levee on the Illinois side, which is carried up to above the level of extreme high water, at which time the width is augmented to 2200 feet.

Both shores are revetted below the low water line with rubble stones, and protected by the wharf pavements above that line. The extreme range between high and low water is 41 feet. Owing to the narrow gorge through which the whole volume of the Mississippi flows, the variations in the bed of the river are very great. Captain James B. Eads, M. Inst. C. E., the distinguished engineer who designed the bridge and superintended its construction, informed the author that a rise of 13 feet less than high water mark caused a scour of 18 feet, and that in the freshet of 1870 the scour reached a depth of 51 feet below low water mark alongside the east pier. These facts induced him to believe it possible, that the scour at times of extraordinary high flood might extend even to the rock itself. He therefore determined to establish the piers and abutments on the rock; and this was done by means of caissons provided with air chambers and locks at depths, for the east pier and east abutment, reaching 136 feet below high water mark, or 110 feet from the surface of the water, when the foundation work was actually performed. This feat, which was satisfactorily executed in 1870–'71, is quite unprecedented in the annals of engineering.*

The piers and abutments are composed of coursed rubble masonry up to low water mark. Above this level they are faced with gray granite from the State of Maine, which cost £10 per cubic yard *in situ*. The interior of the work is of magnesian limestone. The massive appearance of the granite rock facing, and its close jointing, are very striking.

The contract prices and the total quantities of the steel and iron work required for the bridge are as follows:

2,500 tons of steel, at £60 per ton.....	}	of 2,000 lbs.
500 " wrought iron, at £40 per ton.		
1,000 " rolled iron, at £28 per ton...		
200 " cast iron, at £15 per ton.....of 2240 lbs.		

The bridge has three spans, each formed with ribbed arches made of cast steel—a novelty in bridge building. The center span is 520 feet and the side ones 502 feet each in the clear. The rise of the center arch is 47½ feet, that of the side ones 46 feet each. These are by far the largest arched spans in the world, and, under the able direction of Col. Flad, Capt. Eads' chief assistant, they are now being rapidly erected gradually from each pier and abutment, without the aid of centering.* Each span is composed of four double ribs of steel (well braced together, at their relative distances from each other), and the tubes forming them are jointed butt to butt. They are clasped together by wrought iron couplings (which proved to be much better than steel), furnished with parallel grooves corresponding with similar grooves on the tubes. Steel pins, varying from 4¼ inches to 7 inches in diameter, pass through the center of the couplings and the ends of the tubes at every joint. The vertical bracing between the upper and the lower tubular ribs—which are 12 feet apart from center to center—convert the two members into a single arch.

At the time of the author's visit two of the openings were already spanned by the steel tubes, which are all 18 inches in diameter and 12 feet to 13 feet long, but of thicknesses varying from 1⅛ inch to 2⅝ inches.

The arches are to carry a double railroad track, and above the track a roadway, 54 feet wide, for carriages and foot passengers. Capt. Eads hoped to be able to open the bridge in the summer of the following year. As fourteen railroads were waiting to make use of it, he was of opinion that the bridge company would eventually secure a good dividend on their capital, although, from causes too numerous to mention, the outlay on the bridge had already considerably exceeded the original estimate. The extreme range of temperature at St. Louis is 160°; and it is calculated by Capt. Eads that at 140° the arches will rise 8 inches, and that at 20° they will fall as much below the point at which they will be maintained at a medium temperature.

Since the above was written, the author has received a letter from Capt. Eads, dated St. Louis, July 15th, 1874, in which he says:

"My bridge was thoroughly tested on the 2d with 560 tons of engines and 140 tons of tenders. This weight of 700 tons was run, first on one track on each span and then on the other, to produce twisting of the arches, and then it was divided into two trains (seven engines and tenders in each), and these were advanced abreast on to each span to produce the greatest distortion of the curve of the arch, and finally each arch was covered with the trains. The latter produced only 3½ inches deflection on the 520 feet span and 3¼ inches on the other two. No lateral movement could be detected by the instruments under the effect of the side-loading or twisting strain. The deflections were almost in exact accordance with the theoretical computations. The bridge was opened on the 4th July with great enthusiasm, a procession being formed of all trades and callings, which was five hours in passing a fixed point. It was estimated to be 15 miles long, and passed over the bridge and back."

ROEBLING'S RAILROAD SUSPENSION BRIDGE (SINGLE TRACK) OVER THE NIAGARA RIVER. (*Visited 10th October*, 1873, *with Mr. McAlpine, M. Inst. C. E.*)—This bridge has one span of 800 feet, which weighs as many tons. The hight of the tower on the American side is 88 feet, and on the Canadian side 78 feet. The bridge, which is 24 feet wide, and has a road for carriages suspended 28 feet below the railway line, is hung on four wire cables each 10 inches in diameter. Their combined ultimate capacity is about 12,400 tons. To preserve them from rust they are covered with a thick coating of hydraulic cement. The old timber work of the roadway, which is 250 feet above the river, is now being removed and replaced. Trains passing over the bridge are restricted to a speed not exceeding 4 miles an hour. The first locomotive passed over it in March, 1855. The cost of its construction was £96,000, and the railway companies using it pay an annual toll of £9000 a year. The road and passenger tolls bring in about £2000 a year in addition. The rise and fall at the center of this bridge is stated by Mr. Roebling to be 27 inches under a change of 100° of temperature; that is, the roadways are 2¼ feet higher at zero than at a temperature of 100°

INTERNATIONAL RAILROAD BRIDGE (SINGLE TRACK) OVER THE NIAGARA, FROM FORT ERIE TO BUFFALO. (*Visited 14th October*, 1873).—This bridge is being built by a company, of which Mr. Brydges, Assoc. Inst. C. E., is president, and Mr. Hannaford the engineer-in-chief. The chief contractors are Messrs. Gzowski and Macpherson. By common consent, the chief credit in overcoming the extraordinary difficulties which beset the building of the piers of this bridge is due to Col. Gzowski, upon whom all the practical operations devolved.

The river Niagara at Fort Erie is about 1900 feet wide, and its depth ranges from 16 feet to 48 feet. The variation in the level of the river does not exceed 2 feet when uninfluenced by the wind. Its bed consists partly of rock, and partly of clay and large boulders. The normal current is 5½ miles an hour, but during south-west gales it sometimes attains 12 miles an hour—when the water has risen 4 feet in a few hours. With such unusually strong currents, and with ice floes often 3 feet thick to contend against in the winter months, the founding of the piers was no ordinary task. Five of them on the Canadian side are built on the rock, whilst the three on the United States side rest on bearing piles. The masonry was got in by means of outer and inner caissons. The anchoring of the former, while being sunk in place, was a most difficult operation, and quite unique in character as an engineering feat.

The main bridge has nine spans, varying from 180 feet to 250 feet, and is 1968 feet long, including the abutments; but including the length of the bridge across Black Rock Harbor, or the Erie Canal (600 feet), and the embankment joining the two bridges, the total length of the work is 3650 feet. The iron superstructure, all from the Phœnixville Works, is known as the "Pratt" or quadrangular truss. Its great strength is due to its depth, which in the center of the 240 feet spans is 26 feet, and in the center of the "draw" 35 feet. It only weighs 1¼ ton per lineal foot, and was put in place by mooring water-tight caissons between the spans, and then building a platform on them to the required hight. By means of hydrants in the caissons they can be sunk to any level and be easily removed. The draw or swing is 362 feet long, and can be worked either by hand or by steam; by the latter it can be swung in about a minute.

Since the above was penned, Colonel Gzowski has published a most valuable description of the International Bridge,‡ in which he states that it was opened on the 3d of November, 1873, and that the cost was about £300,000, including extras and interest on the outlay during construction.

* Capt. Eads' reports to the Illinois and St. Louis Bridge Company from 1868–'71, containing a full account of the foundations of the bridge, are in the library of the Institution.

* All details concerning the erection of the arches are given in a valuable paper read before the American Society of Civil Engineers by Mr. J. C. Cooper, C. E.

‡ This work is in the library of the Institution.

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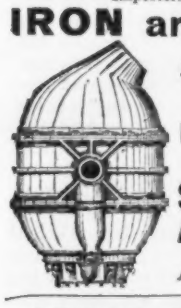
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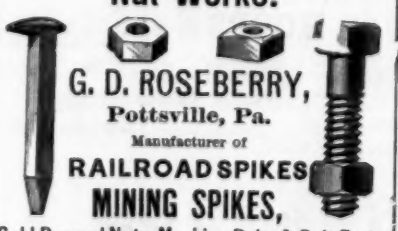
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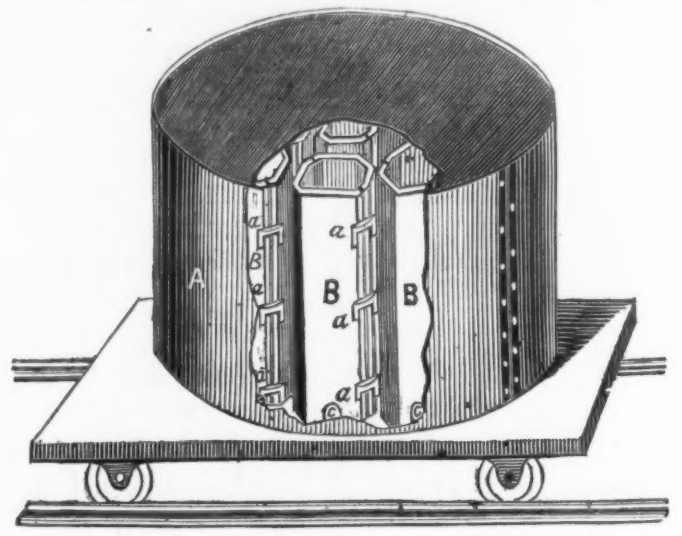
New Patents.

We take from the records of the Patent Office in Washington the following specifications of certain patents lately issued, which will be found interesting:

IMPROVEMENT IN ANNEALING FURNACE SLAG CASTINGS.

Specification forming part of Letters Patent, No. 162,932, dated May 4, 1875, issued to Fred. A. Luckenbach, of New York, N. Y.

This invention is designed to provide for the manufacture of paving and building blocks, fire brick, and other articles, from the slag of blast furnaces, which shall be of even and uniform texture and homogeneous character throughout, and which shall be refractory in a degree hitherto unknown, possessed of unusual hardness, and consequent capacity for resisting wear, concussion and attrition, as well as resisting the action of fire when required. The invention comprises a novel process of annealing such castings, by providing around them an external mass of molten slag, which, inclosing the casting, and itself slowly cooling, retards radiation of heat from the castings, and thus insures the correspondingly slow cooling of the casting with even and uniform contraction in all its parts, thereby insuring its homogenity and solidity throughout.



IMPROVED FURNACE FOR ANNEALING SLAG CASTINGS.—*Fig.* 1.

Figure 1 is a perspective and partial sectional view, showing the combination of the molds within the box or casing, with the required chambers between, as arranged preparatory to the practice of the invention. Fig. 2 is a detached sectional view on a larger scale of the molds.

A is a box or casing of boiler plate or other suitable material, and of any preferred shape or configuration. For convenience of moving, this box A may be mounted upon a truck or wheeled support of any kind. This box is made in vertical sections, united by bolts or keys that may be easily withdrawn to permit the removal of the same after the solidification of the slag as hereinbefore explained. B are the molds, made in vertical or longitudinal sections, held together by clamps *a* or other well known or suitable devices, each mold having an opening at opposite sides of its lower end, as shown at *c*. Each mold has annular ribs *f*, or angular cross-section, extending around its inner circumference, at any required distances apart, as indicated in Fig. 2, the molds being of iron, either cast or wrought. Any desired number are set on end within the box A, and molten slag from the blast furnace is run into the box.

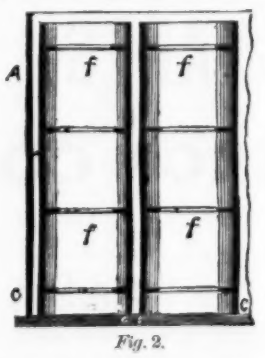


Fig. 2.

The slag, passing through the openings *a* on the bottom of each mold, fills the mold to the same hight as it reaches in the box, or rather in the chambers formed by the interspaces between the molds, until the molds are filled, and also the chambers or interspaces between them and within the box, the slag in the said chambers surrounding the molds, which are embedded therein. The box thus filled is then allowed to stand, whereupon the mass of molten slag surrounding the molds, being itself of an intensely high temperature, effectually retards the radiation of heat from the molds, or rather of the slag contained in them. Moreover, the mass of slag surrounding the molds being uniform in its temperature, such slow radiation of heat from the molds as does occur is uniform from all parts thereof. From this it follows that uniform contraction in all its parts is secured to the casting within each mold. And inasmuch as difference in the texture, hardness, density and refractoriness of slag castings are always due to differences in the temperature, time occupied, and other conditions attendant on the cooling of the castings, it follows that my invention, insuring as it does perfect uniformity of cooling, with the requisite slowness for annealing, provides for the production of slag castings perfectly uniform in texture of homogeneous character throughout all portions of them.

In some cases a more perfect annealing of the castings than is required for their use for ordinary purposes may be desired. In the event of this, place the box charged with the external mass of molten slag surrounding the inclosed molds bodily within an oven or system of ovens—such, for example, as shown and described in the Patent No. 133,466, dated November 26, 1872, by which means the radiation of heat from the external mass of slag is itself measurably retarded, and this, by aiding the action of the said mass in retarding radiation from the castings within the molds, prolongs the annealing process, and renders it in some degree more thorough and effective.

When the box A, with its contents, has become cooled to the requisite degree, the sections of the said box are removed from the solidified contents, the external mass of slag is pried or knocked away, which in practice is readily done, and the molds are taken apart to permit the removal of the annealed castings contained therein.

Claim.—The process of annealing slag castings by the gradual cooling of a surrounding mass of slag cast simultaneously therewith, substantially as set forth.

IMPROVEMENT IN REFINING BASE METAL BULLION.

Specifications forming part of Letters Patent No. 162,891, dated May 4, 1875, issued to Frederick H. Bousfield, of San Francisco, California.

The metal to which this process has especial reference is essentially an alloy of gold, silver and copper, and silver and copper in variable proportions, and apt to contain, beside, an appreciable percentage of other metals coming under the general denomination of "base." These alloys or mixtures of metals are produced in the various processes of gold and silver extraction from their ores in the art and in the minting of money.

The purification or refining of such mixtures has hitherto been effected by various processes, all of which have necessitated the consumption or waste of a certain amount of the oxidizing medium, whether nitric acid, sulphuric acid, or a mixture of both acids. In this process waste is entirely obviated, and the necessary oxidation brought about by an entirely different method, eminently simple and economical.

The process is, strictly speaking, a concentration of the fine metals, as the gold and silver remain intact, while the base ones only are removed, so that it may be regarded as a cheap preliminary operation preparatory to the final separation of each metal. It consists of five distinct operations, viz., first, melting and preparing the metal for operation No. 2 and granulation; second, roasting the granulations; third, leaching the roasted mass with weak sulphuric acid; fourth, subsequently leaching with brine; fifth, melting into fine bars.

The success of the whole operation depends upon the roasting of the granulated metal.

To bring about a complete roasting, or the oxidation of the maximum amount of copper, it is necessary (if the bullion does not already contain it) to add two to five per cent. of lead, or sufficient leady bullion to bring it up to this proportion before granulating. This causes the metal to effloresce and form a spongy porous mass in the roasting, whereby the oxidation is greatly and rapidly promoted. Without this addition the most prolonged exposure to the oxidizing influence of a furnace will only secure a partial conversion of a film like character, which protects the rest of the metal from the beneficial influence, and fails to secure more than a minimum of oxides. The granulations should be pretty fine, which is effected by pouring the molten metal through perforated ladles into cold water.

The furnacing or roasting is carried on, by choice, in a muffled furnace, somewhat similar to those now in use at the wet-extraction works for the roasting of copper ores, and which is simply an enlarged form of which the chemist's muffle furnace is the type.

The leaching with weak sulphuric acid renders the oxide of copper easily soluble. It has only to be concentrated by evaporation for the crystallized sulphate of copper to separate, and be at once a marketable article. It is effected in lead lined tanks or vats heated with steam.

The leaching with brine, which is to be hot and concentrated, is for the purpose of removing the lead, which has been successively converted into oxide by the furnacing, and sulphate by the sulphuric acid, of the previous operation.

The brine is to be contained in wooden tanks, and changed from time to time. The completion of this portion of the operation may be readily ascertained by a portion of the brine solution failing to give a white precipitate with solution of liquid ammonia.

The last part of the process consists in washing the spongy mass once or twice with hot water, drying and fusing with borax in an ordinary plumbago or clay crucible, and casting into bars.

By this process it is possible to refine bullion containing sixty per cent. up to 995 fine, or within five one-thousandths of purity. The process is also applicable to the refining of base metal amalgams, as, by incorporating the proper amount of lead amalgam with the base metal amalgam previous to retorting, the same efflorescence and spongification and oxidation are brought about by removing the door of the retort, and exposing the mass to the continued action of the heat subsequent to the completion of the retorting proper. The metal will then be found in a condition admitting of the after processes of leaching.

Claim.—The process herein described for refining bullion—that is, by adding, while melted, lead to the amount of about two or five per cent., granulating the alloy, roasting the granules, and subsequently leaching with the sulphuric acid, and then brine, substantially as set forth.

The Composition of Metalline.

NEW YORK, June 17, 1875.

To the Editor of The Iron Age: DEAR SIR.—In your issue of this date we notice an article headed "The Composition of Metalline," translated from the *Deutsche Industrie Zeitung* of May 20. This article, while acknowledging the great merits of metalline, charges that its composition was concealed in our patent, and insinuates that this was done from improper motives. The ground of the charge is a published analysis of a specimen of metalline procured from the English metalline office by B. Hoff, the analysis having appeared in the *Polytechnisches Journal*.

In justice to ourselves we ask you to publish the following statement, which an examination of the English patent (which is the one referred to in your article) will confirm, showing the unfounded nature of the above charge.

The specifications of the patent covering the invention of metalline describe a new mode of putting substances together, and then fifteen examples are given composed of different substances, mineral, vegetable and animal, intended to show the broad range of matter which can be thus treated. It is stated that nearly 5000 varieties of metalline have been made, and that drawing our resources from the vegetable, animal and mineral kingdoms, many millions of varieties may be produced.

The claims in the patent are as follows:

1st. "The process herein set forth of selecting, treating, compounding and consolidating certain substances by which are produced new compositions of matter (denominated by the inventor "Metalline") designed for the purpose of journal boxes, and other parts of machinery, and other articles whose surfaces in use are subjected to friction, and which substances possess such properties and conditions that in the practical use in machinery, and elsewhere in the arts, of such articles made of it, so little friction is actually caused and so little heat thereby developed, that all necessity for the application of oil or any other lubricant is entirely obviated, as herein set forth.

2d. "Each of the several compositions of matter hereinbefore described, when respectively composed of the substances specified, or their respective equivalents, and compounded and consolidated in the manner described, or any other manner by which an equivalent effect is obtained for the purposes named."

Prof. Hoff evidently obtained, in England, and submitted to analysis, a sample of metalline varying in the materials composing it from any of the examples given in the patent as mere illustrations of our process.

If he had applied to us we could have furnished him with hundreds of specimens of varieties now in successful use in machinery, each one of which varies from that analyzed by him in every particular, except in the mode of their manufacture. Making as we do no secret of the process covered by our patents, we would be happy to show to Mr. Hoff, as we have shown to many scientific men, all the details of the manufacture of metalline, with the composition of the numerous varieties which we have made. Yours, very truly,

AMERICAN METALLINE CO.,
61 Warren street, New York.

The rolling mills of the McCullough Iron Company, including those at North East, Elkton and Rowlandville, Md., are in operation, but are suffering from the lack of sufficient water in the streams by which they are run—the Elk creeks and the Octoraro. The company are making every effort to complete their two new mills in Wilmington, which will be run by steam, and hope to get them in operation in July. They are said to be the finest rolling mills in the country.

The Leetonia, Ohio, Pottery Company have the foundation walls for their buildings about completed; their dimensions will be 60x99 feet front, and 50x150 feet deep, will be two stories high, and be built of brick throughout.

C. H. Nimson, Esq., has leased the Emaus Iron Company's Works, at Emaus, Pa., together with all mines and other property belonging thereto.

It is said that the Bellaire, Ohio, Nail Works are shipping a large proportion of their product direct to California.

There are 23 carriage shops in Cleveland, a number of which manufacture work exceeding $30,000 per annum.

The Ashland Machine Company, Ashland, Ohio, have suspended operations.

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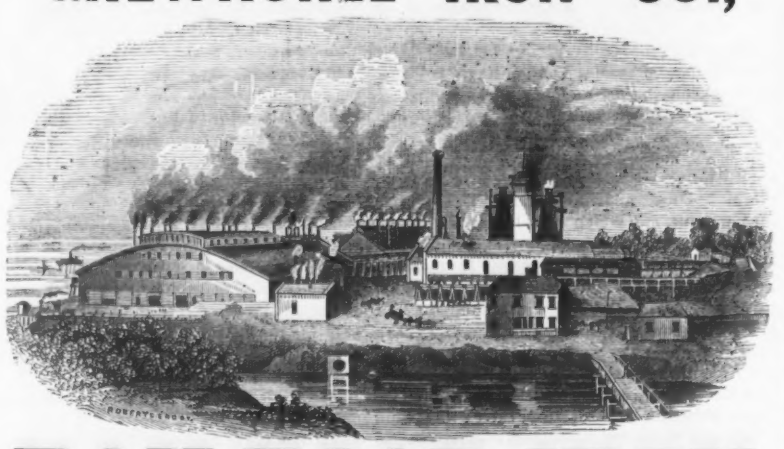

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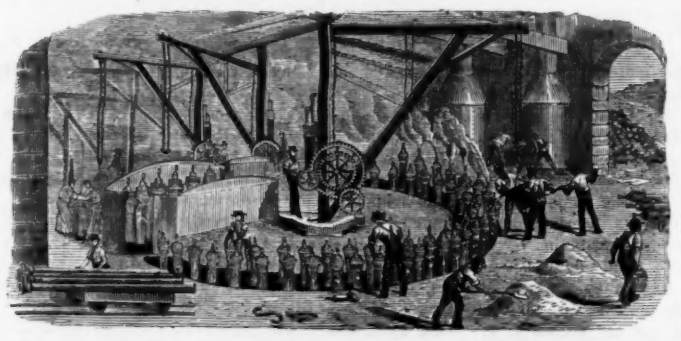

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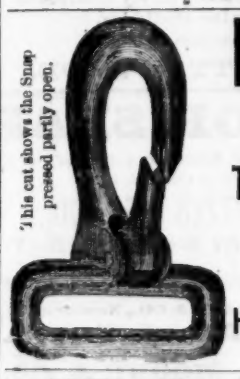

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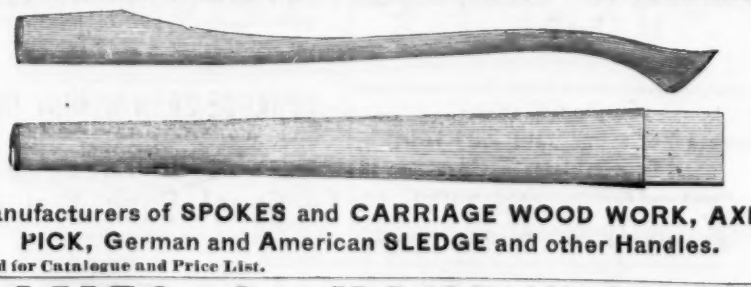

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The Ores of Iron Considered in their Geological Relations.

BY PROF. WARINGTON W. SMYTH, M.A., F.R.S.

The following is a copy of the lecture delivered by Mr. Smyth to the members of the Iron and Steel Institute, at the annual meeting, on Wednesday, May 5th:

In addressing an audience like this Institute, composed of men to whom the subject matter is familiar, the lecturer has the advantage of being able to dispense with most of the usual introductory explanations. I will, therefore, with the concurrence of my hearers, assume that it is unnecessary to dwell upon the special characters of the different ores of iron, further than to accentuate those in particular upon which my later statements and arguments in to-night's discourse will mainly depend, omitting the discussion of certain silicates, rarely employed for smelting, and of iron pyrites, the recent technical history of which has introduced to us a new purple ore on a large scale. The ores of iron to which I would invite your present attention are simply the oxides as met with *per se*, or combined with water, or with carbonic acid—the substances, in fact, which form the great bulk of the material employed for the production of the metal. When we observe the various results of analysis, or even carefully look into the actual samples of ore, there are often anomalies noticeable where not expected, often two or more kinds mingled together, and giving intermediate results; but I hold it not the less desirable that, as far as possible, we should fix the characters of certain species, hold fast to them through their sundry minor variations, and learn how to follow the clue when these substances are found to pass distinctly from one specific condition to another. I would, therefore, pass under review these important ores, to impress their individuality on the memory, and would then consider some of the changes which nature in many cases has wrought in them, and which sometimes may even need to be noticed in the smelting process, but which, very generally, will have to engage the attention of the explorer and the miner.

Magnetite.—First in order, if we omit from the elementary metal, which, as such, is a rare and often disputed constituent of the earth's crust, we recognize magnetite or magnetic iron ore, by its octahedral crystallization, often taking partially or entirely the form of the rhombic dodecahedron, but even when almost compact, betraying its crystalline form by the brightness of the triangular faces, further by its black color, and black streak, and its magnetic property often showing polarity. This mineral, $FeO + Fe^2O^3$, with 72·41 per cent. when pure, is the fine rich ore which Dannemora in Sweden, Arendal in Norway, and several other mines in Scandinavia, have worked with great success for centuries, from elongated deposits which are neither lodes nor true strata. It is mainly this ore which forms the vast mass at Gellivara, in Lapland, apparently on a larger scale than any other known agglomeration of iron ore; this it is also which is the chief constituent of the remarkable protrusions boasted of by the Uralian metallurgists, the Katschkanar, the Blagodat, near Kuschwinsk, and the Vissokaya Gora. In Italy, fine examples of magnetite are those of Traversella, in the Piedmontese Alps, and that of Cape Calamita, in the Isle of Elba. In North America, the older stratified rocks, both Laurentian and Huronian, in Canada, as well as in New York and New Jersey, abound in strips, beds, and masses of magnetite, which are concordant with the stratification, and, though by no means uniformly rich, are sometimes wondrously massive. These have been opened out in hundreds of mines,* and are doubtless destined to play a great part in the iron trade of the United States. In Great Britain a few localities only can be quoted as offering magnetite in workable quantities—a small vein near Penryn, in Cornwall, and another or two near Roche, and perhaps that of Ballycoog, near Arklow, ought to be available in favorable times; while a singular series of several successive beds exist at Hey Tor, near Bovey, in Devon, which has only now, in these last few weeks, been placed in a working position. [Mr. Smyth here submitted a section of these remarkable crystalline deposits, as showing on the line of cross cut level a thickness worthy of attention, and a mode of occurrence bearing strong analogy to some of the Scandinavian mines]. The minutely crystalline magnetite, which occurs on the north flanks of Aran Mowddy and of Cader Idris, in North Wales, has never yet been opened out with perseverance, and the objection to some of it, that it is pyritous, is to be met by more careful selection.

Hematite.—The second species is the well known hematite termed specular ore, or oligiste, when crystallized; red ore or kidney ore, when in a compact or fibrous condition. This substance, Fe^2O^3, with 70 per cent. of iron in its state of highest purity, is too well known to need description, and an important ingredient in the trade of most of the iron making countries, is distinguishable in most cases instantly, if not by its external aspect, by the blood-red streak, which is sometimes difficult to produce on surfaces as hard and as smooth as polished steel, will appear even though the color of the outside be purple or black. The value of this ore, so little recognized 30 years ago, is now too well known for me to enlarge upon. Its strange occurrence in Furness and near Whitehaven has been well described in the pages of your journal; and a very curious parallel to the nothern mines may be found on a smaller scale in the numerous deposits, partly of red and partly of brown hematite, which have for years been worked in the Mendip Hills. I have to thank the proprietors and agents of two of the most remarkable of these mines for enabling me to place before you to-night the plan and section of the Roanhead and Park deposit, and those of the Hodbarrow mine. There could not be better examples of the entire irregularity of form assumed by these vast masses, of their great productive capability, and of the well-merited success due to the unsparing use of the boring rods. In our western districts, as near St. Austell, and at Exmoor, hematite occurs in veins, not generally large, but exhibiting some splendid ores, and showing, where they intersect the clay slates, an analogy with the rich district of Siegen, in Prussia, also situated on rocks of the Devonian system. There are cases in which these ores are certainly of a bedded character, as in Canada, and at La Marquette, in Michigan, where very extensive workings have proved certain strata, mostly made up of this ore, to be from 50 to near 100 feet in thickness. Probably those of Bilbao may be thus stratified. The Americans seem mostly to ascribe an intrusive origin to their great masses of red ore in Missouri, the well-known Pilot Knob and Iron Mountain; and the magnificent displays of ore in Elba, some seven in number, occurring in a straight line, are regarded by numerous authors as of volcanic origin. In fact, when observers have been familiar with the marvelous production of crystallized specular iron by sublimation from the neighboring volcanic vents, it is easy to lean to the belief of its being connected with volcanic influences in Elba.

Bauxite and Woehnite.—The curious ores to which the names of Bauxite and Woehnite have been given, in which alumina, Al^2O^3, takes the place of much of the sesquioxide of iron, deserve special mention, from the fact of the Irish variety being so largely employed in the smelting of hematites. Mr. Snelus has kindly supplied me with analyses of some of these ores in practical use, which, with a percentage of 58, 34·37 and 28·93 of peroxide of iron, contain respectively 17·89, 39·20 and 45·75 of alumina.

Turgite.—Next, we have an ore called Turgite, after the mine of Turginsk, in the Ural Mountains, $Fe^2O^3 + H^2O$, an oxide of iron, with 5·3 per cent. of water of brownish color, but with bright red streak; otherwise, with fibrous structure and mammilated surface, looking much like the botryoidal hematites. We know but little about this species, yet it doubtless occurs largely among the brown ores which come to the furnace. It is quoted as found at divers European localities, especially Horhausen, in Nassau, and it has been met with at the Restormel Mine, in Cornwall. A compact black ore now being raised at that mine gave to Mr. Ward, of Dr. Percy's laboratory, only 3·25 per cent. of water.

Gothite is the name generally given to the definite compound $Fe^2O^3 + H^2O$, in which 10 per cent. of water is added to the ferric oxide. One of the varieties, Lespidverokite, is translucent and red by transmitted light; another "needle iron ore," brilliant, but only slightly translucent; a third, wood iron, opaque and fibrous; a fourth, brown or black ore, opaque, and with no regular structure; but, from the splendent prismatic crystals of Lostwithiel downward, all these varieties have a brown streak. The most notable examples of these ores in our own country are at the Restormal Mine, in Cornwall, on Exmoor, on the Brendon Hill, in the Mendip, near Bristol, and in the Forest of Dean; but there are very numerous places, at home as well as abroad, where, amidst the ores called in the large scale brown iron, or brown hematite, a portion will prove to be this monohydrate, while other parts of the same deposit may, very likely, belong to the next following species.

Limonite, $2\,Fe^2O^3 + 3\,H^2O$, with iron 59·9, and water 14·4 per cent. A large proportion of the "brown iron ore," or that which gives a brown streak, belongs to this series, but both the external contour and the structure are very variable. The fact of the brown ores being often met with in the shallower parts of repositories, which may contain other substances in depth, is an explanation of their having been largely explored and worked from a very early period. Thus, as a stratified rock limonite, it may sometimes in great thickness be followed downward a long way without change, as in the mines near Elbingerode, in the Hartz, or it may change downward into the impure carbonate, as in the lias and oolitic strata. When in veins it will commonly be found to constitute a sort of gossan or iron hat, fated to yield to other minerals in depth. In the Alston Moor district, hitherto but little worked, it is observable that the "rider" of the lead lodes often shows itself at surface in a great mass of brown ores; and similarly, in the central part of Cornwall, between Par Station and Ladock, a number of lodes, apparently continuous in their course, with veins bearing elsewhere copper and tin ores, carry, as they approach, and, in some cases, enter the granite rock, brown ores in considerable abundance. To illustrate the different conditions of hydration and admixture in brown ores from the same locality, I am enabled, by Messrs. Snelus and E. Jackson, to compare two examples of the ore so largely imported from Porman, near Carthagena:

	No. 1.	No. 2.
Peroxide of iron	83·80	74·85
Alumina	·50	3·00
Oxide of manganese	trace	0·83
Lime	..	1·69
Magnesia	..	0·55
Silica	1·50	8·60
Sulphur	·20	0·21
Phosphoric acid	·07	0·14
Combined water	14·00	10·17
	100·07	100·04
Metallic iron	58·6	52·40

No. 1, a particularly lustrous, stripy ore, would thus approach limonite; No. 2, Gothite in its composition.

Xanthoriderite, or yellow iron ore, $Fe^2O^3 + H^2O$, with 18·4 per cent. of water. This ore is of a yellowish color, sometimes in silky fibres and needles; in other cases, more like an ochre; but it is cited definitely from only a few localities; and from the character of the occurence, so commonly in successive incrustation, it is difficult, with many of the substances called "morass," or "bog iron ore," etc., to feel assured where the line should be drawn.

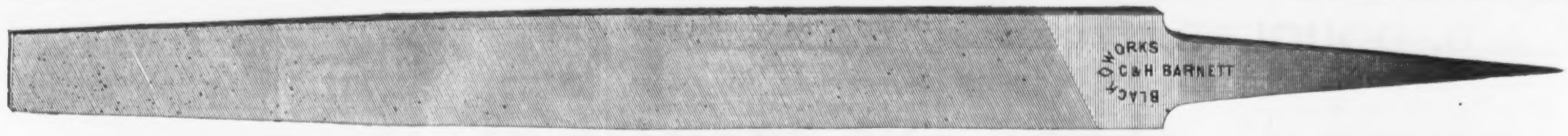
Chalybite, Siderite, White Iron Ore, Carbonate, Spathic, Spathose, or Sparry Iron.—FeO, CO_2, with 62·1 of protoxide of iron. Such a percentage would give 48·22 of metallic iron; but this is an ore which almost invariably contains, in lieu of some of the iron, a notable amount of manganese, calcium, or magnesium. The rhombohedral crystallization and the crystalline structure are sometimes minutely, but often largely lamellar, both outer and inner planes often curvilinear, with its light shades of color so readily hightened by exposure; these are tolerably distinct external characters. It is only, however, within the last twenty-five years that inquiries after steel irons, and more recently after the means of making spiegeleisen, have attracted attention to it in this country, and have led to extended observations like those read by Mr. Smith to your institute a year ago. The late Mr. Charles Attwood was the first to utilize the considerable quantities of this mineral present as "rider" in the iron-stones of many of the lead mines in Weardale and other parts of the North. In the granite of Foxdale, in the Isle of Man, in the great cross-course lead lode of Frank Mills, in Devon and in many of the Cornish mines, the admixture of chalybeate with other ores is often on a large scale, but its value is commonly marred by difficulties of carriage. More important is the range of veins occupying a length of some 30 miles in Somerset and North Devon, from the Ebbw Vale mine of Raleigh's Cross westward, to near Ilfracombe. Nor can I omit to mention the fine lode of Perran, sometimes 100 feet across, if taken horizontally from wall to wall, where workings, commenced in brown ore, have opened downward, at depths of from 30 to 120 feet, into large masses of chalybeate. The varieties of iron-stone in which the carbonate is mingled with a very variable amount of clay, of lime carbonate, or of carbonaceous matter, are thoroughly well known to my hearers from their wide diffusion over this country, and their commercial importance. They are, in fact, objects of more interest to the smelter than to the mineralogist. Certain of these, as the celebrated Cleveland ore, date their employment from a very few years ago; others, like the dark pisolitic masses of the pulverzoic schists of Anglesey and North Wales, have hitherto met with but little attention. Let us now, in order to see more clearly the relationship between these several oxides, examine a few typical specimens, taken from localities where the development may be studied on a large scale. I place on the table a piece of what looks like chalybeate or spathic ore from Huttenberg, in Corinthia; it is covered with large rhombohedral crystals, characteristic of that ore, and through the mass may be traced lines showing the tendency to rhombohedral cleavage. But it is chalybeate no longer; the brown streak, the presence of water, and the percentage of iron, prove it to have been changed into brown ore. Here is a fragment from the lodes of the Deer Park in Exmoor; the cellular mass is pervaded by lines still exhibiting distinctly the rhombohedral structure; but the rich brown color, and the innumerable array of brilliant needles of Gothite, show that this, too, has lost its carbonic acid, has acquired oxygen and water, and actually become a different substance. The first stage of the change may be observed in heaps exposed on the shaft tips, even for a few months; a brown tint, hightening with time, takes the place of the yellowish gray, and shows that a chemical action attacks the exterior and proceeds toward the interior. Similarly, at Raleigh's Cross, that well-defined lode, in places over 20 feet in thickness, was found at from 25 to 30 fathoms deep (vertically) to yield lumps of cellular ore, with kernels of undecomposed spathic, and thence down to the bottom of the mine this latter ore in greatly increased proportion.* In the Great Perran lode, near Truro, the entire mass, sometimes for a few feet in depth, in other places down to 10 or 20 fathoms, is proved to consist of brown ores, which then begin to show nuclei of undecomposed chalybeate; and, lastly, solid masses of that mineral. It has been argued by some† that the change commences with the formation of the more hydrated species, and passes through successive stages to those with the least amount of water; but on this point the evidence is as yet defective. The brown ores are undoubtedly (for one may watch the process in old workings) formed by another series of changes, from pyrites through the sulphate of iron. The crystals of brown ore, in the form of pyrites, are among the best known pseudomorphs, and there are localities which invite the inference that this action has taken place on an important scale. Let us now proceed a step further. It was long since argued by Haidinger that red ore is a pseudomorph after brown ore, and many instances were cited to prove that this change may generally be proved to have taken place. Unfortunately, the most notable example described was that of specimens from Restormel. The highest authorities were called in to aid in the decision. Gustav Rose, crystallographically, showed that the forms of the crystals were those of Gothite; Rammelsberg proved that the substance was pure anhydrous oxide. I fear, however, that the whole phenomenon arose from the ingenuity of a roguish mineral dealer, who, by exposing the Gothite to a suitable heat, expelled the water, and thus manufactured deceptive specimens. But the fact is better borne out in other cases, and, though difficult to prove in hard fragments, it has been shown by Morgans that a good deal of red ore was found in shallow levels of the Raleigh's Cross vein, which may, probably, have passed through the intermediate hydrated stage. If we now examine a specimen from Bearland Wood, on Brendon Hill, another from Rogerslode, Exmoor, a third from the Eiserne Haardt, by Siegen, and fourth from Somorrostro, at Bilbao—all analogous—we shall notice, first, that the large crystals are the rhombohedrons of chalybeate; second, that the distinct cleavage of that mineral permeates the entire mass; third, that the substance is pure red ore; and, fourth, that this last crystallizes out boldly as specular. In all these cases, therefore, and innumerable others, even to a batch of ore brought by the indefatigable Livingstone from Central Africa, the hematite has indisputably been originally deposited as chalybeate. I dare not venture, in the present brief sketch, upon the vexed question of the original deposition of our great northern masses of hematite, although strong arguments for their having once been chalybeate may be deduced from the occurrence of mountain limestone fossils turned into red ore. The half-way stage may be seen on the north side of Cross Fell, where, at Fox fold, I have obtained fossils, now brown ore, which must, in all probability, have been changed *in situ*, through the intermediate stage of the carbonate. There is still a last change of condition among the oxides of iron to be noticed. Is it not a significant fact that magnetite is characteristic of the older formations of those bodies of rock which have, during the longest period of time, been exposed to the influences which bring about metamorphism and change of substance? In the Perran lode small portions of magnetite have been found among the brown ores near the surface. In some of the Cornish copper lodes, notably in the Fowey Consols, specimens of magnetic ore have occurred which look very much as if they had been carbonates. Among the beautiful red ores of Siegen small grains of magnetite appear to testify to a partial change; and in the classical case of the mine Alte Birke,‡ in Siegen, a singular black, rather powdery, substance, "eisenmulm," shows how the ore of the mine, in some places chalybeate, in others red ore, is changed into an earthy magnetite. This, it is true, has been by some explained by the contiguity of a dyke; but, without dwelling on the opposing arguments of Bischof, there appear to be sufficient grounds for believing that, in many cases at least, this last change in the degree of oxidation may be produced by the ordinary action of natural causes.

* See "Transactions of the American Institute of Mining Engineers," Philadelphia, 1874.

* See the excellent description by Mr. Morgans, in "Proc. S. Wales Inst. for 1868."

† See Volger—Entwickelungs-geschichte der mineralien.

‡ v. Leinhard, Basaltgebilde, and Bischof, Geologie II., p. 798



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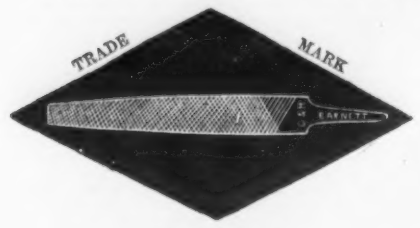

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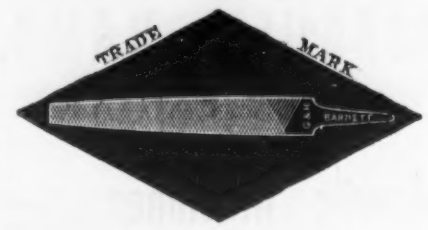

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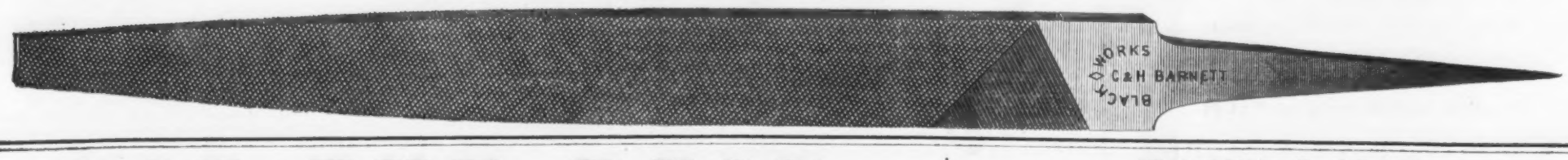

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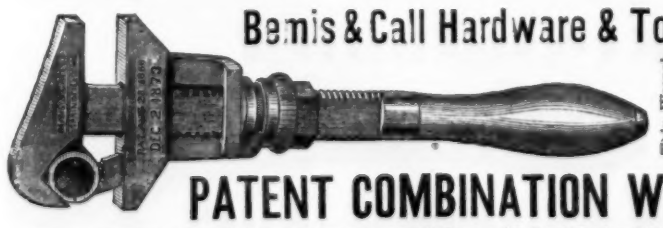

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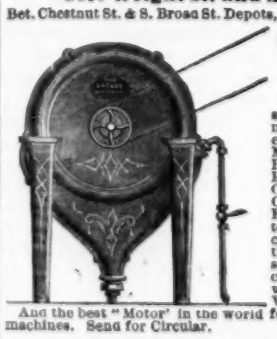

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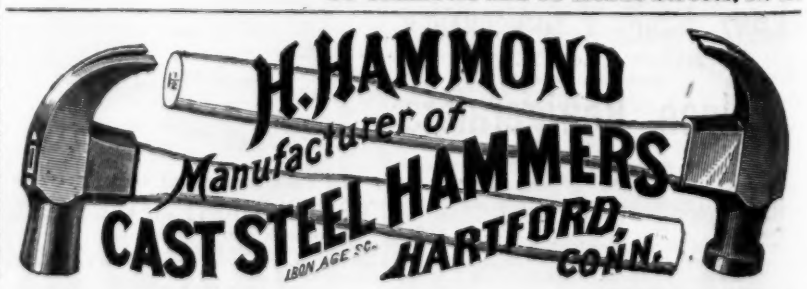

BUSINESS ITEMS.

PENNSYLVANIA.

The Pennsylvania Steel Company, near Harrisburg, are at work on an order for 5000 tons of steel rails for the Southern Pacific Railroad Company, of California. The Bethlehem works are filling an order for the same road. These rails are to be shipped to San Francisco, and will be used in filling the gap of 100 miles which now exists between the Los Angeles division of the Southern Pacific and Tulara Valley division.

Work in the Reading Railroad shops is going on about as it did before the suspension. About 1300 men are employed, the majority of them working ten hours a day.

WEST VIRGINIA.

Quinimont Furnace, owned by the New River Car Company, situated on the line of the C. and O. road, with a stack of 60 feet by 12 feet, using coke, makes 180 tons pig iron per week at a cost of $17·27 per ton at the furnace. Freight to the Ohio River $1·50.

TENNESSEE.

A company for the manufacture of iron wagons has been formed in Clarksville, and contracts have been made to erect the necessary buildings.

CONNECTICUT.

The loss by the burning of the repair shop of the New York, New Haven and Hartford Railroad here is less than at first estimated, and will probably not exceed $20,000; no insurance. The shop will be immediately rebuilt.

The Berkshire *Courier* says that the new furnace of Barnum Richardson Company, at East Canaan, which was blown out about one week since, performed one of the greatest feats that has ever been made by any charcoal furnace in the United States, by the production of 803½ tons of car wheel iron at a single blast continuing 104 weeks.

Milo Peck, of New Haven, one of the oldest manufacturers of drop presses in the United States, has just shipped a press to Birmingham, England, which works with a drop of 2500 lbs., 2½ feet fall, 60 times per minute.

Mr. John Adt, machinist and inventor, of New Haven, has invented and is now manufacturing a machine which will cut, bend and finish 500 staples a minute.

The Beecher Manufacturing Company, of Meriden, have been annoyed so much by injunctions and suits brought by people who complained of the noise of their drop hammers, that they have decided to leave that place and locate elsewhere.

NEW HAMPSHIRE.

The Ranlet Manufacturing Company, Laconia, have constructed a freight car which can safely carry two tons of freight to one of dead weight, the reverse of which is true of ordinary freight cars. The body of the car is supported upon one truck of six wheels.

MASSACHUSETTS.

The Holyoke Machine Company have just sent a five-roll sheet super-calendar to a large paper mill in Southern France, and are sending their work to San Francisco and Nova Scotia. They are now making a specialty of their recently patented web super-calendars. They have begun a 600 pound Gould patent rag engine, which they have the exclusive right of manufacturing, for the Harding Paper Mill, at Philadelphia, owned by the Philadelphia *Inquirer*, and where its paper is made.

The Heskins Engine Company, at Fitchburg, have increased their working force, and continue running full time. They have shipped one of their 20-horse double hoisting machines to Lee, and have added several orders to their books within the past month for their upright steam engines.

The Burleigh Rock Drill Company, of Fitchburg, are building one of the largest compressors they have ever made. Its capacity will be equal to the delivery of 1,356,800 cubic inches of air per minute, and it will be operated by the Ophir Silver Mining Company, Gold Hill, Nevada. This compressor is probably the largest in the world, and will likely be duplicated for exhibition at the Centennial. They will be fitted with the Putnam Machine Company's valve motion. The Burleigh Rock Drill Company have completed and set up the machinery for sinking the shaft on the Newburyport silver mine, and have just delivered to the United States Coast Marine Department a set of drills for service in the harbors of Rockland and Bangor, Maine. They have been particularly successful with their drill for working at bed rock 20 feet under water, while their stoping drill for overhead work has had great success.

The Fitchburg Machine Company have, during the past month, again added to their force, which now numbers about 200 men on full time. The increase has been necessary, for, in addition to the press of orders recently noted, they have a contract for the tools to fit up a large and recently built railroad shop at Oswego, N. Y., and also a contract to furnish and fit the new shops of the Winchester Rock Drill Company, at Springfield, Mass. They have also received from C. H. Brown & Co., the celebrated engine builders, an order for a planer which will weigh, complete, 28 tons. This tool will have a 22 foot table and 40 foot bed, and plane a surface 6 feet square and 72 inches high.

OHIO.

Three hundred men are employed at the steel wire mills of the Cleveland Rolling Mill Company, in the Eighteenth ward, and 500 tons of wire are made per month.

The Globe Iron Works Company, of Cleveland, are erecting a fine brick boiler shop, 75 by 112 feet, adjoining their other works, having use for both the old and new shops.

The Haddock Nail Machine and Manufacturing Company intend to erect nail works in Cincinnati.

The Cleveland City Forge and Iron Company, 80 hands; Lake Shore Foundry, 150 hands, are full up with orders.

The car wheel foundry, at Cleveland, is running to its full capacity. The Fulton Company are also runnning full, turning out 32 car wheels per day.

The Globe Mill, at Cincinnati, is running single, making sheets, plate and merchant iron, producing 150 tons per week.

CALIFORNIA.

The San Francisco Boiler works employ 375 men, and the working time is 23 hours.

Mr. J. L. Heald, of Vallejo, is building six straw burning engines of the following dimensions: Cylinder, 8 inches, 12 inch stroke, and 16 horse-power; boiler, 9 feet 6 inches long, 40 inches diameter, a 24 inch main flue, thirty-two 2¼ inch tubes 7 feet long. Engine bolted on to side of boiler. Shive governor and improved heater; adjustable exhaust. Some of the boilers are of steel.

ILLINOIS.

The Chicago and Joliet Rolling Mills are said to have orders for new steel rails sufficient to keep their steel department running for a year to come, aggregating 75,000 tons. These orders are from the Rock Island, Alton, Illinois Central, Michigan Central and the Union and Central Pacific roads, and all are to replace old rails. The Chicago *Tribune* states that these orders have been nearly all taken by the two mills in Chicago and the one at Joliet at 40 per cent. less than the ruling rate in 1873 and 25 per cent. less than the current rate for foreign rails.

The works of the Joseph H. Brown Iron and Steel Company, the construction of which is to be rapidly pushed forward, are to be located on 90 acres of ground, donated for the purpose, on the Calumet River, at South Chicago. The property has a dock frontage of 1500 feet, and as the river is 14 feet deep, and the iron bridges which span it have 60 feet draws, lake vessels can easily go up to the works. Instead of the original design of erecting works with capacity of 50 tons only per day, just enough to work up the daily production of scrap iron in this city, the plans have been extended, and the works will have a capacity of from 150 to 200 tons per day. It is intended to have everything completed by September 1, 1876. About $2,000,000 will be used in the plant. The incorporators are: Joseph H. Brown, president, of Youngstown, O.; Samuel Hale, of Chicago; Geo. A. Hale, of Chicago; Wm. Bonnell, of Youngstown; Charles B. Hale, of Chicago; Joseph T. Torrence, of Chicago, and Richard Brown, of Youngstown.

MISSOURI.

The St. Louis Rail Fastening Company have taken the contract for furnishing all the fastenings for the extension of the Atchison, Topeka and Santa Fe Road.

MICHIGAN.

The Menominee Furnace has fired up, after five weeks' suspension, for the purpose of building a new stack. She was blown in June 7th, and everything has since been working satisfactorily and well.

The Marquette and Pacific Rolling Mill, whose furnace has been banked up for about a fortnight, fired up and went into blast on Thursday, June 10th.

Is there Too Much Iron?

The New York *Herald* gravely comments as follows on the condition of the iron market. We hope a subscription will be started to buy a few sample text books of metallurgy for the *Herald* library:

People have not stopped using iron. To be sure we have stopped building railroads at last, and in other countries they have begun to stop, also. There is evidently an over production of the most useful and important of metals. Why is it? Is it not, partly, because iron so abundant, so easly and cheaply produced in so many different parts of the world, is not destroyed by its first use? A shirt or a pair of trousers is destroyed by the wearer; an old hat is flung away; food is consumed, as we correctly say. But in that sense iron is not consumed. When a rail is worn down it is sent to the foundry and remelted, and its substance goes some way toward the making of a new rail. Old iron of all kinds has a commercial value, and is saved and sold, and used over again, and often improved by the first use. No farmer ever lets an old horseshoe lie on the road. He picks it up, and the blacksmith with a little labor makes a new horseshoe of it. Who can tell at what stage, after how many years of service in different capacities, a piece of iron finally disappears and is actually consumed? Perhaps those Pennsylvanians were wise who some years ago bought up a large part of the very rich iron and coal lands of Alabama, and then concluded to let them lie undeveloped until they saw whether it would pay to set up new furnaces and rolling mills.

Meantime it is pleasant to know that we have actually begun to export iron to Europe. In 1872 we exported 1477 tons of pig iron, and by 1874 the trade had grown to 16,039 tons. We can produce in some parts of the United States iron of a quality which Europe does produce so cheaply, and with this our iron masters ought to supply England and Continental Europe in constantly increasing quantities. Alabama furnaces now send iron to England, where it is found valuable for the construction of cast car wheels.

The superintendent of the Bellaire Rolling Mill and Nail Factory has gone East to negotiate with reference to the purchase of self-feeding nail cutters. The striking feeders are still out.

The Co-operative Iron and Steel Works have been running steadily for the past two weeks, and are the only iron works at present in operation in town. They have been turning out some of the prettiest rails ever made in Danville.—*Danville, Pa., American.*

GEORGE GUEUTAL & SON,

39 West 4th St., New York.

IMPORTER OF

Wood Screws, Steel in Sheets,

BAND SAWS, TOOLS FOR BRAZING, &c.

Bed Screws, Pin Hinges, and Wire Nails a Specialty.

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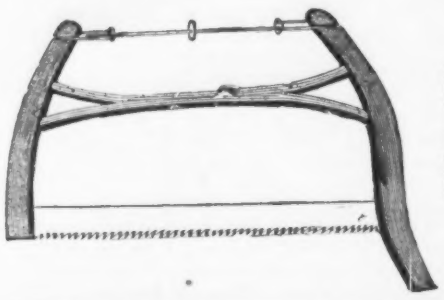
MANUFACTURER OF

Saws of all kinds.

FACTORY, WILLIAMSBURGH, N. Y.



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Patented June 28th, 1870.

The annexed engraving represents my ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any center bolt, secures for the Frame great strength and durability. These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

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PERFORATED CROSS-CUT SAWS

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THE SILVER STEEL

DIAMOND CROSS-CUT SAW.

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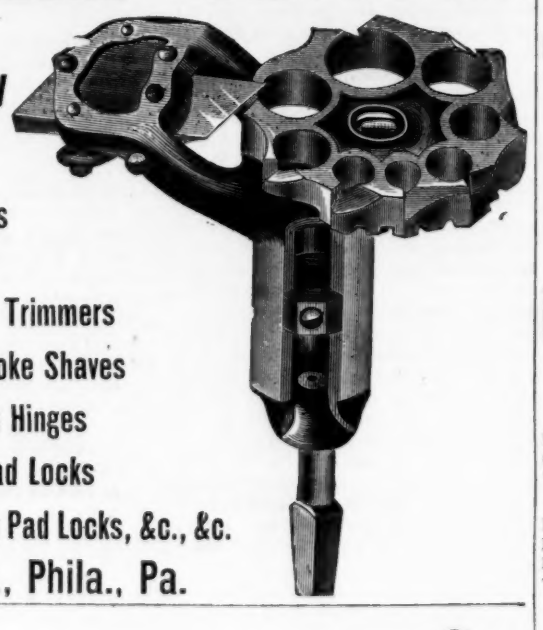

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Bonney's Spoke Trimmers

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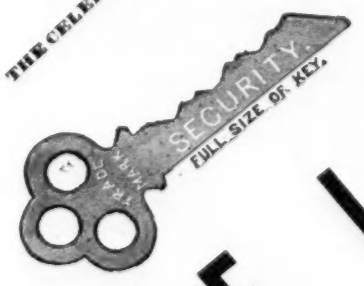

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Saws of all kinds.

Also Sole Manufacturer of

LIGHTNING SAWS.

Two Direct Cutting Edges, instead of one Scraping point.

Note extra steel and durability over the old V, outlined on M tooth.

Telegram Dated Oct. 1st, 1874.

STATE FAIR, EASTON, PA.

To HENRY DISSTON & SONS:

Philadelphia, Pa.

I want you to publicly test that challenge on Cross Cut Saws. Name time and place within thirty days. American Institute preferred. E. M. BOYNTON.

E. M. Boynton gave on Wednesday of last week an exhibition of what his Lightning Saw could do at the Pennsylvania State Fair, in which two men sawed through a sound oak log, 16 inches in diameter, in 17 seconds. Mr. Boynton informs us that his export trade is increasing, he having lately made large shipments of his saws to Australia and other distant markets.—*The Iron Age*, Oct. 8, 1874.

For fuller report of this exhibition see the *Easton Morning Dispatch* of Oct. 1st, 1874.

Henry Disston & Sons cannot furnish Lightning Saws. Why do they imitate mine?

J. FLINT,

Manufacturer of

ALL KINDS OF

SAWS

And Plastering Trowels,

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A large Stock of **Cross Cut Saws** constantly on hand. Orders filled promptly. **Dietrich's Double Handle One Man Cross Cut Saw** made with any kind of tooth desired. Our patent method of grinding Hand Saws makes them superior to any in the market.

Send for Illustrated Price List.

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HORSE SHOE NAILS.

Manufactured from the best of **NORWAY** Iron, nd warranted to give entire satisfaction.

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NEPONSET, MASS.

Rogers' Self-Sharpening

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The best Hoe in market. It will not batter or break. Wears itself sharp. Will last twice as long as any other Hoe, and is warranted to cut the "Bolles Hoe" or any Hoe in market.

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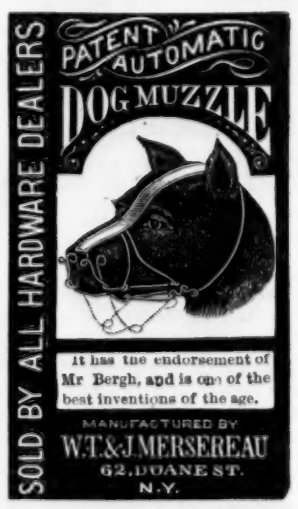

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Manufacturers of Warranted Cast Steel

SAWS

of every description, including

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of the well known brand of

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BRANCH OFFICE:

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Manufactured from

BEST NORWAY IRON,

by BRUNDAGE & CO. Sold by

WHEELER, MADDEN & CLEMSON

Middletown, Orange Co., N. Y.

make a specialty of the LARGEST SIZES of **Circular Saws**, and call particular attention of lumber manufacturers to the following points of excellence:

Evenness of Temper.—The peculiar structure of my furnace subjects all parts of the saw to a DEAD heat, and when dipped in the oil bath secures perfect uniformity.

Perfect Accuracy in Thickness.—My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed BALANCES PERFECTLY, which is proof positive of the right accomplishment of the work.

Properly Hammered.—Great care is taken that no saw shall leave my works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, cannot be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time RUN TRUE. This department is under the personal supervision of myself, who has devoted over *twenty years* to the art of saw making.

I am sole proprietor and manufacturer of the celebrated **"Challenge" Cross-Cut Saw.** Price Lists of all kinds of saws sent on application.

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Iron and Steel Clamps, Die Dogs, Clamp Dogs,

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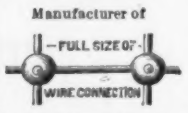

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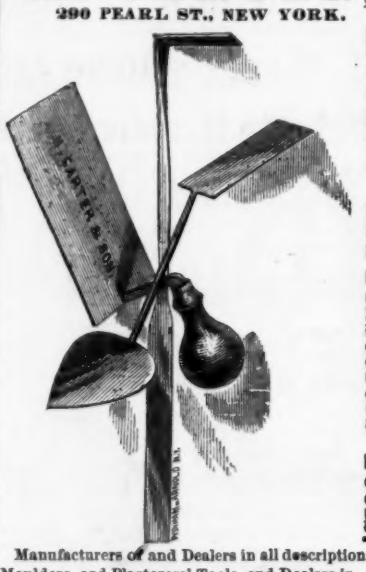
Moulders' and Plasterers' Tools.



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Borax, Glue, Oils, Twines Cordage, Emery, Sand, Hardware and Straw Papers, Babbit Metal, White Lead, &c.

New Publications.

HAND-BOOK OF LAND AND MARINE ENGINES, including modelling, construction, running and management of land and marine engines and boilers. By Stephen Roper, Engineer, Philadelphia. Claxton, Remsen & Haffelfinger, 628 Market street. 598 pages.

The author of this hand-book says in his preface that his object in preparing it "has been to present to the practical inquirer a book to which he can refer with confidence for information in regard to every branch of his profession."

Rules and directions expressed in algebraic formulæ are of little service to the majority of engineers, because they are not fully understood. The author, keeping this in mind, has avoided most of the points which render many of our handbooks of limited value to the practical man. He has had a long and extensive practical experience among the men for whom he writes, and understanding their wants, has produced a book which seems admirably adapted to those who have anything to do, in a practical way, with steam machinery. We have given the work a careful examination, and consider it one of the most satisfactory works of the kind we have ever seen. Mr. Roper thoroughly understands his subject, being entirely practical and, at the same time, having a correct understanding of scientific principles. His chapters on the theory of steam engineering are so simple and practical that there is no mechanic in the country, however ignorant he may be of higher mathematics, who cannot learn all they are intended to teach. His practical directions for the management of engines are just such as we should expect from an experienced engineer who had spent all his life in an engine room, but who had learned the theory as well as the practice of his trade. They are plain and to the point, and the reader may accept them with an entire confidence. His descriptions of engines, pumps and the appliances connected with engines, are exceedingly satisfactory, as are also his rules, which seem to be the best and simplest which could be formulated. The book has an abundance of tabular information, which seems to include all the tables that could be of any use. The engravings are good, and are just what is wanted to explain the text. In a word, the amount and kind of information contained in this little work seems to be all that could be desired. The owner of a steam engine cannot well do without it, and no one who runs an engine should be ignorant of any part of its contents.

A DEFENCE OF THE U. S. PATENT SYSTEM, by John S. Perry, Albany.

OUR COUNTRY'S DEBT TO PATENTS, by H. Howson, Philadelphia.

This is the first of a series of publications to be issued by the United States Patent Association, a society which grew out of the Patent Convention assembled in Washington, January 15, 1874. The object of that convention was to discuss and pass upon certain propositions enunciated by the Patent Congress held at Vienna in the summer of 1873, in relation to the principles which should govern the protection of the rights of inventors in all countries. The Vienna propositions looked to a gradual unification of the patent systems of civilized nations; and the National Committee appointed by the congress were enjoined "to use all their influence that the principles adopted be made known as widely as possible, and carried into practice;" and were, moreover, authorized "to endeavor to bring about an exchange of opinions on the subject, and to call, from time to time, meetings and conferences of the friends of patent protection." The Patent Convention, finding the time which could be allotted to such a meeting would not be sufficient for full discussion or intelligent action on all the questions relating to the protection of the rights of inventors, on which an expression of opinion was desired, determined that it would immediately proceed to organize a permanent society, to be known as the United States Patent Association, to which should be referred the various questions submitted to the Convention, and which should be charged with the duty of taking the necessary measures to bring about intelligent and united action by the inventors of the country to secure better protection of their rights, by developing a healthy public sentiment on the subject; by collecting and disseminating information relating to the effect of patents upon the industry and productive force of nations; by urging appropriate legislation upon Congress, especially with reference to simplifying and cheapening the legal remedies for infringements upon the rights of inventors; by co-operating in the movement now making in Europe for the establishment of more just and equitable patent systems abroad; and, generally, to take such action as might be deemed most for the advantage of inventors and of all who are interested in patent property.

The Association was accordingly organized January 16, 1874, by the adoption of a Constitution and By-laws, reported by a committee, and approved by the Convention, and by the election of a Board of Officers and Directors representing all sections of the country, and every form of interest in inventions and patents.

The second article of the Constitution declares that the "Association is not formed as a combination against any class or interest, nor shall the influence or means of this Association be used to aid any individual enterprise, or to promote any personal scheme." The varied character of the Board of Government, consisting as it does of men from all the different quarters of the country, and of different professions, is a guaranty of the good faith of this declaration.

One of the most important duties of the Association is the collection and publication of statistical information in reference to the relation of patents to the manufacturing and productive industry of the United States with a view to demonstrate the effect of a liberal patent system in developing the prosperity of nations. This branch of its operations will be of special importance in reference to its effect upon sentiment abroad, in encouraging the existing tendency of European opinion in favor of the adoption of a patent system closely assimilated to our own.

Glancing over the essays we find them of interest and value as contributions to the popular literature of the subject of which they treat. They are calculated to disseminate useful information respecting the nature of patents and the privileges and obligations which they grant and impose.

Illustrated and Descriptive Catalogue and Price Lists of Wares Manufactured by the Iron Clad Can Company. Offices, 23 Cliff street, N. Y.

This Catalogue includes illustrations, descriptions and prices of goods adapted to butter and cheese factories; railroad and city milk cans, of the New York, Chicago, St. Louis, Cincinnati, Philadelphia and Boston patterns; goods adapted to cotton and woolen factories; oil and ink cans; galvanized and sheet iron ware, stamped ware and tinners' trimmings. The catalogue is well illustrated, and will be found useful by all who deal in such goods.

PHILADELPHIA CORRESPONDENCE.

PHILADELPHIA, June 21, 1875.

That the Centennial year will bring with it all and more of the excitement with which it has been credited is not to be doubted, from the evidence of the lesser and preliminary side shows of that grand revival, which have already been celebrated in North Carolina, in Pennsylvania and in Massachusetts. The spirit of the people is so thoroughly aroused that we cannot by any possibility overestimate the effect on the general business interests of the country. While, therefore, the business of this city, in common with that of many others, has been considerably interfered with during the past week by the celebration of the Centennial of the Battle of Bunker Hill, the time given to the occasion has by no means been lost, but rather may we look for a great stimulus to internal improvement, general industry and commerce between the States by the reunion of citizens from all sections of the country in a duty common to the patriotism of all. As the time, therefore, draws nearer to the celebration of the National Centennial, we may expect to see this feeling intensified, until there can be nothing left of sectional feeling to interfere with the progress of our national industry, wealth and prosperity.

The close of the coal strike has of course been the feature of interest for the week to consumers of coal, as well as to merchants generally. As previously reported by me, the failure of the committee of the union to negotiate either with the president of the Reading Railroad Company, or with the Coal Exchange, was the immediate cause of the resumption of work, as well as of the disbanding of the union. While the latter has been as yet only the case in the Schuylkill region, it is believed that it will very soon follow in the Wyoming and Luzerne coal fields, and that no further such stoppage of production is to be expected among the anthracite coal miners of the country. The effect on trade has already been felt here, and the general impression is that in common with the cessation of the railroad war the two settlements are the most auspicious events of the season, and will ensure, if anything can, an active trade for the remainder of the year. This has been the longest and most severe struggle between the operators and men which we have known. The loss of life and property has been great, while no possible benefit has accrued to any one, and the lesson has been so severely felt by all that it is most probable it will prevent a like occurrence in the future.

The meeting of the National Board of Trade, which has been holding its seventh annual session in this city during the week, has been of unusual interest and importance. Not only did the condition of the business of the country's industry and commerce afford abundant and momentous topics for discussion by as truly representative a body of men, but the list of subjects to be considered by the Board included matters of grave interest at the present time. No less than twenty-seven commercial and trade organizations were represented at this session, while the delegates bear the names of leaders in business enterprise in all the great commercial centers of the country. Moreover, the Philadelphia Board of Trade very wisely took advantage of the conjunction of so many leading business men of the country in this city at this time, to bring them in connection with the Centennial authorities, and to show them the progress of the work on the buildings as accomplished. This was all done without obtrusiveness or any impropriety, and with the happiest effect, since, without exception, all were pleased, and an amount of enthusiasm excited which will secure the influence, in their respective communities, of such solid men as the National Board of Trade is composed of.

The topics under discussion necessarily took a wide range, and the report of the executive committee included recommendations in regard to changes in the national bankrupt law, the resumption of specie payments, and matters relative to currency and finance; against the payments of moieties to informers of infractions of the revenue laws; the Canadian reciprocity business, &c. The election of officers was followed by the reading of communications from the Associated Chamber of Commerce of Great Britain, and an invitation to the meeting of that body in Leeds, in September. The reports of committees, as presented, were generally very exhaustive of the subjects committed to them, such as those on transportation, which reviewed the whole subject of railway combinations, national interference in railways, fast freight lines, and a side shot at the tariff, by recommending "the promotion of our home industries, not by prohibitory tariffs, but by revenue laws that will afford incidental protection, by moderate and discriminating duties on imports," &c., &c. A sensible proposition, but one admitting of too much centralization of power, was the following, viz.:

Whereas, Internal improvements are now made spasmodically, and in great waste of the public money; therefore,

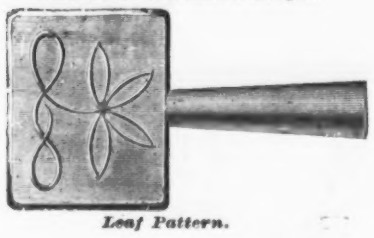
Resolved, That Congress be memorialized to establish a bureau of internal improvements analogous to the coast survey, to make preliminary surveys, and suggest a comprehensive and thorough system of improvement.

Subsequently discussions of importance were had upon the postal telegraph system, and the establishment of a system of uniform weights and measures, practically looking to the adoption of the metric system of France. After the adoption of numerous resolutions, among which was one highly endorsing the Centennial Exposition, and assuring its success, and the transaction of considerable routine business the board adjourned *sine die*.

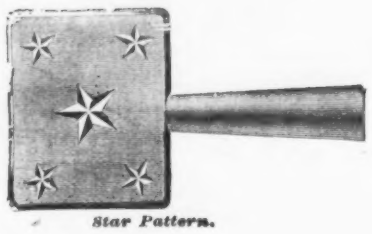
The last monthly meeting of the Franklin Institute was unusually interesting in mechanical devices and novelties. Among the curiosities was shown a piece of flat rail made in England, in 1831, laid in the track of the Camden and Amboy Railroad, in 1832, and in constant use since. The history of the process of manufacture of this rail would be of interest. A new light for microscopic purposes was exhibited, and a specimen of the new toughened glass treated by the Bastie process of annealing in oil. A Gramme electrical machine, driven by a 5 horse-power engine on the stage, was exhibited and described by Prof. Barker, &c., &c. The proceedings were highly interesting, and shows the progress in practical science made by the Institute.

H. D. SMITH & CO., PLANTSVILLE, CONN.

Patent Embossed Steps.



Leaf Pattern.

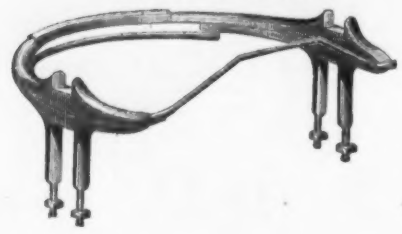


Star Pattern.

King Bolt Yokes.

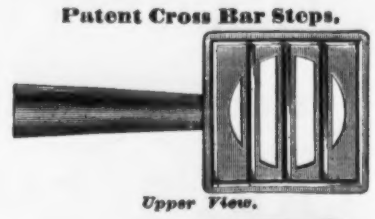
Established 1850.

No. 6 Fifth Wheels.



1871 Pattern Shaft Couplings.

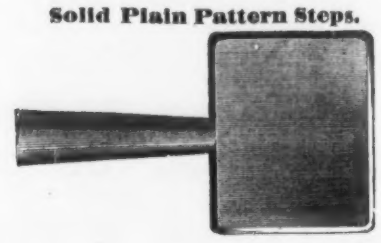
Patent Cross Bar Steps.



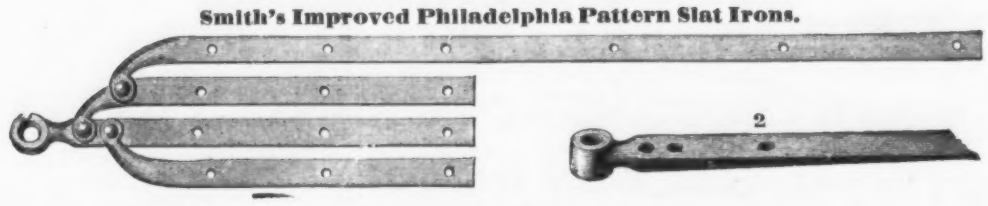
Upper View.

Lower View.

Solid Plain Pattern Steps.



Smith's Improved Philadelphia Pattern Slat Irons.



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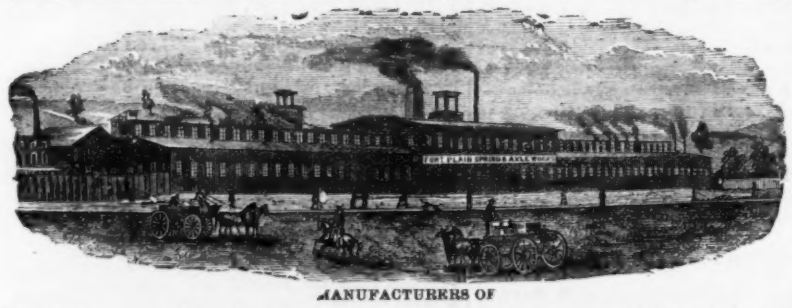

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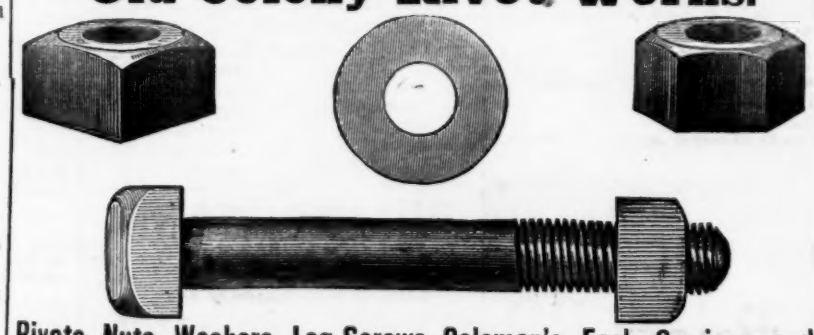

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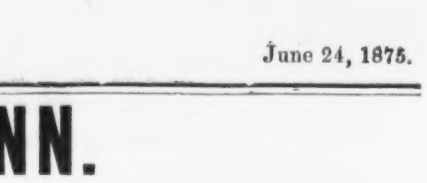

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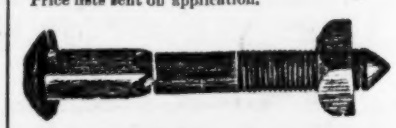
Price lists sent on application.



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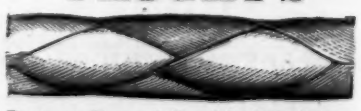
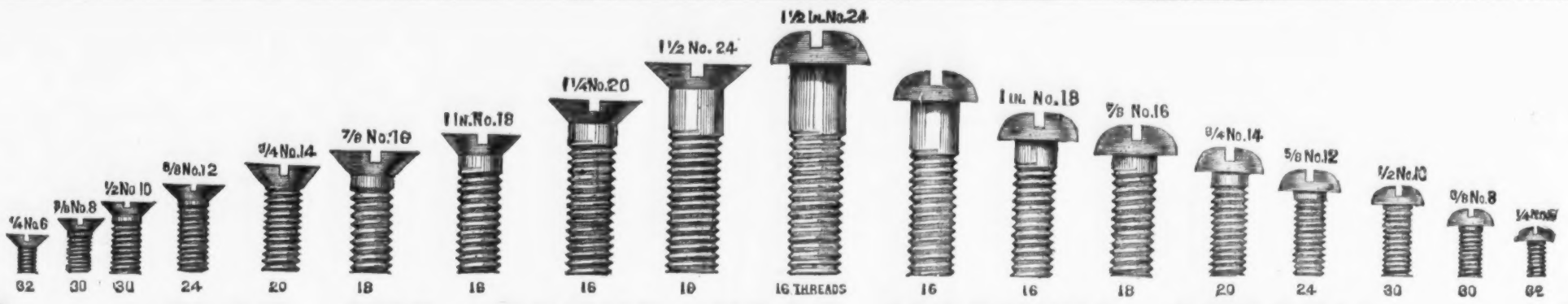


Patent Round Braided Belting,

301 & 303 Cherry Street, PHILADELPHIA.



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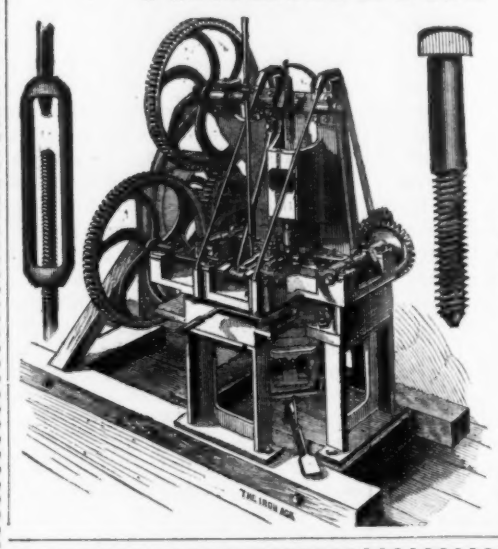

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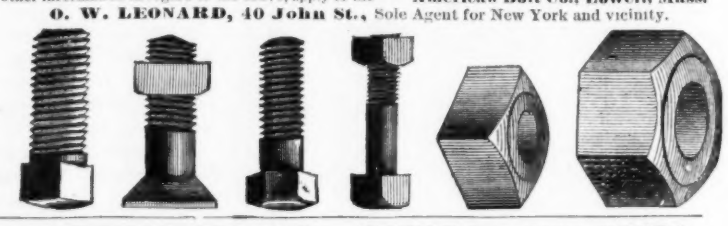

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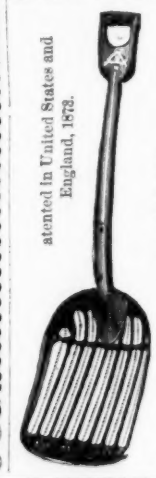

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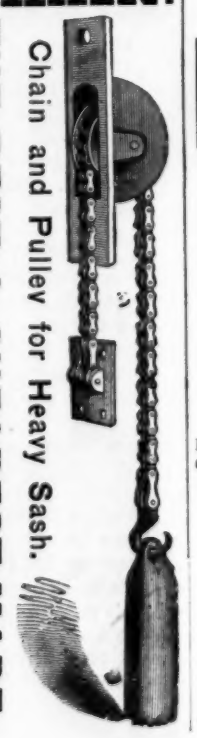

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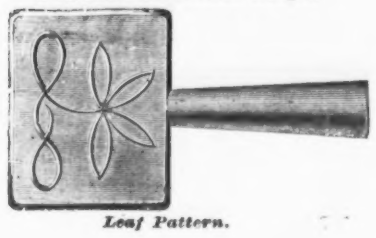

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Established 1850.

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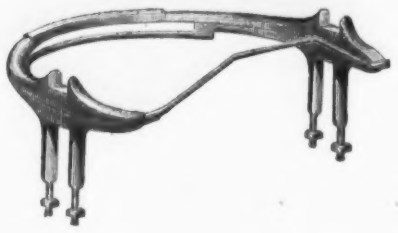

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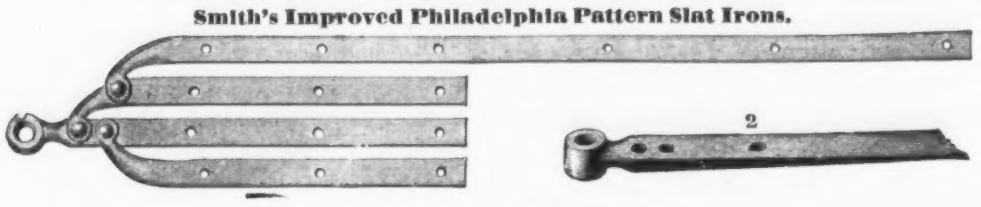
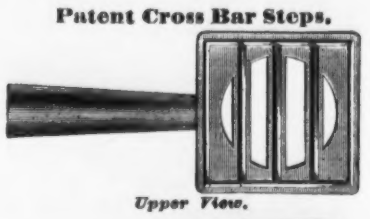
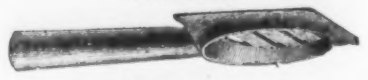


Patent Cross Bar Steps.

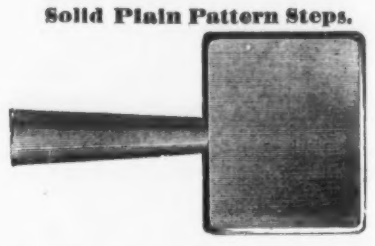


Upper View.



Lower View.

Solid Plain Pattern Steps.



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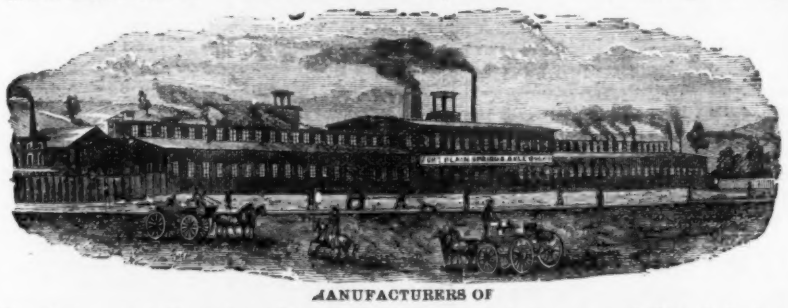

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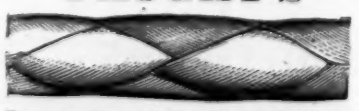

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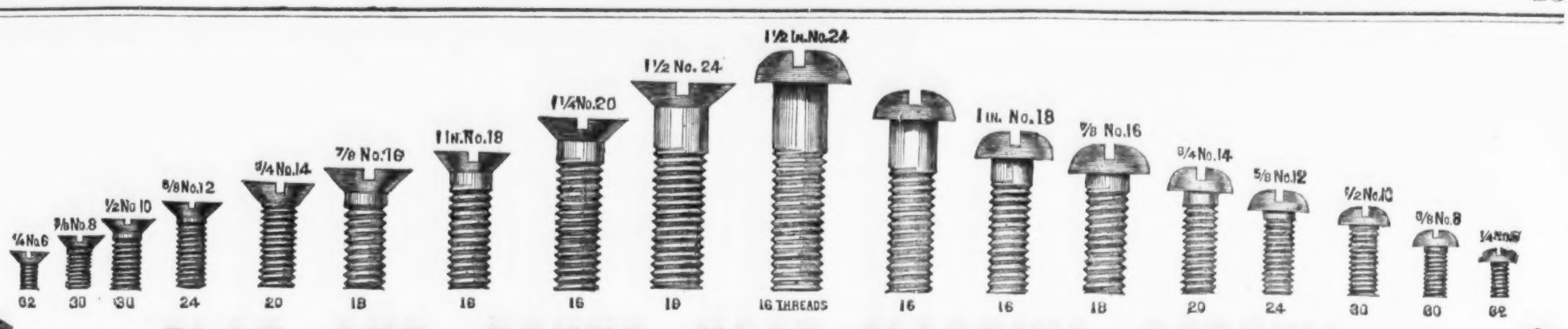

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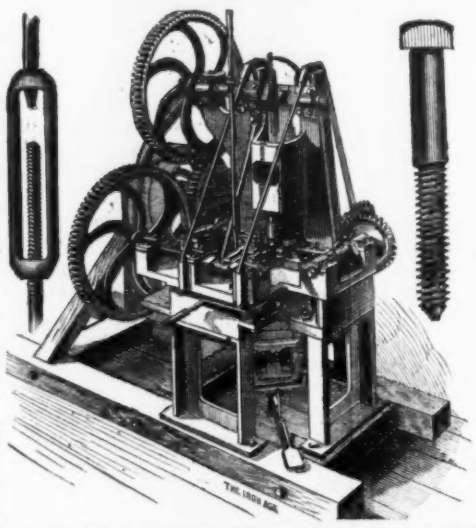

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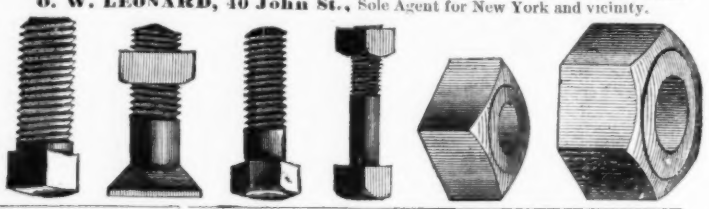

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JOHN S. KING - - *Business Manager.*

NEW YORK, January 2, 1875.

Until 1st instant the postage on newspapers was paid by subscribers at the office where the paper was received, the yearly rates on the different editions of *The Iron Age* being as follows: Weekly, 40 cents; Semi-Monthly, 40 cents; Monthly, 24 cents.

Under the provisions of the new postal law, which went into effect on the 1st instant, prepayment at the office of mailing is required, at the rate of two cents per pound for the Weekly, and three cents per pound for the Semi-Monthly and Monthly, which will make the postage as follows on the different editions: Weekly, 50 cents; Semi-Monthly, 30 cents; Monthly, 15 cents.

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CONTENTS.

The Progress in Car Building.

An interesting item has lately been going the rounds of the press, and has found its way into several of our foreign exchanges. We quote it as follows:

In the "run off" on the Philadelphia, Wilmington and Baltimore Railroad, recently, nobody was hurt, although three coaches crowded with passengers were thrown from the track. The train was running at the rate of 25 miles an hour, and when the tremendous speed was suddenly checked the concussion was terrible, but the framework of the cars held together, and, except some slight concussions, passengers suffered nothing more than a great fright. The cars were dragged along the ground for a considerable distance, but even this rough test did not change their contour, although the windows and panels were considerably broken. There can be no doubt that the lives of the passengers were [illegible] the great strength of the coaches.

This illustrates very well the point which the science of car building has reached at the present time. To understand what progress has been made we must glance at the work of the last 50 years. Men are now alive, and still at work at the trade, who built the first cars that ran upon railways in this country. The first cars were simply coach bodies of the common pattern, placed upon wheels. The next step consisted of putting two or more bodies together, and giving them a common frame and supporting them on wheels. This style of building gave a very weak structure. The whole strength was in the lower frame. Introducing doors into the sides destroyed the strength to such a degree that, in a long car the floor was the only part that furnished an efficient resistance to shocks of any kind. Cars of this character, with doors in the sides, are extensively used abroad, and their weakness is painfully shown in any accident which happens to send them off the irons. In the early days of railroading, one man was engineer, master mechanic, master car builder and superintendent. With the increase of the traffic the car department got too large to be successfully run under the same management as that of the motive power, and a new office was gradually created, by taking the car department out from under the charge of the master mechanic and giving it a head of its own, or a master car builder. Space would fail if we should attempt to trace the progress of this department of railroading from the time it became a separate branch to the present day. Although one of the youngest branches of railroad industry, and one held in too light esteem, it is one of the most important, and, in some respects, takes rank ahead of any other. The value of the cars upon a railway are generally several times greater than that of the engines, the expenses of construction are greater and the repair bills much heavier. The requirements in a railway car are varied, and of a character which no previous mechanical experience would enable us to meet; a new art had to be developed. It was as new a problem as that of the locomotive, and in many respects there was less data from which to start.

The first cars were, as we have seen, a succession of boxes, without strength as a whole, placed upon a frame. Our builders for a long time followed the style of framing which this construction entailed, and even did so after the long car came in fashion; and we are sorry to say that hundreds of cars built upon this plan are still running upon our railroads. They are so weak in the framing that it is almost impossible for a train of such cars to leave the rails without meeting serious injury. Passengers are generally killed everytime one of these cars is ditched, and we have known the same thing to happen when the train only jumped the track on a level, or ran out of an open switch on the ballast. Car builders soon began to appreciate the fact that in the common railway service, cars received shocks nearly equal to those incident to a collision. Many of the frightful accidents of early railroad days are now seen to have owed their deadly character entirely to the miserably weak cars, which went all to pieces at a trivial blow. It is impossible to distroy a car, no matter in how gentle a manner, without killing, or, at least, seriously injuring, the persons in it. A heavier style of floor framing was then adopted. The reader will understand that the whole strength of a car, so far as resistance to shocks is concerned, is to be found below the level of the window sills. Above this the car body is made as light as may be.

To illustrate the resisting power of a first class passenger car of the present day, we may mention an accident happening on the Hudson River road, in which a freight engine, at a speed of some 25 or 30 miles per hour, struck a passenger car fairly upon the end. The platform of the car was smashed, but though the end of the car was broken in, the engine did not reach the first seats. The concussion was so great that the engine was thrown over, if we remember rightly, into the river, seriously injured. Such a thing is by no means an exceptional occurrence. Not long ago a passenger car was run into a large depot at a good rate of speed and under the charge of an inexperienced brakeman. Being detached from the train, the man did not get the brake on soon enough, and the car struck the buffers at the end of the track, tore them out and ripped up 10 or 15 feet of the stone platform beyond. The platform was damaged to the value of $400, but the car was put in running order at an expense of about $30 or $40. The fact that the car was in motion was certainly in its favor, but that would by no means account for the small damage done to the car. The car was strong at the point where strength was needed, and resisted as was intended. On another road with which we are familiar, a car was pushed from the track and dragged through a well ballasted freight yard, and over some rails which were slid off from a platform car by the accident. This car was built in the old style of framing, and, on taking it out to the repair shop, it was found that the whole central portion of the floor, almost from truck to truck, was destroyed, every timber being broken or carried away. A few months afterward we were not at all surprised to hear that, in a rear collision; two trains on this road had been utterly wrecked and great loss of life followed. People in general attributed it to carelessness and the disobedience of orders, but the real cause was to be found in the fact that the cars had no power of resistance and were not able to withstand a hard blow. On other roads we have known trains to get just such blows and be none the worse for it, with nobody killed. To illustrate the matter in another way we mention an accident that happened three or four years since near to New York. Two day cars of different patterns in an express train jumped the track and ran about three quarters of a mile over the frozen road bed before they were stopped. The load in each was about the same, but the damage done was by no means equal in the two. One car had pounded its trucks all to pieces, and was free from them, the body dragging on the ground. In the other car the extent of the damage was the cracking of a journal box (a casting for holding the end of the axle) and the breaking of a jaw, another casting, in which the journal box plays. In one case the repairs cost probably $5, while in the other a whole new set of trucks was needed. The secret of this great difference was in the construction. During the winter of 1873 two trains, of about the same size, upon different roads, and running at ordinary passenger speeds, were ditched. So far as could be learned the circumstances were very similar, no cars in either case turning over, the country being flat. On one road several people were killed, on the other "nobody hurt." So far as could be gathered from inquiries, the train in which people had been injured was made up of cheap cars poorly constructed. On the other road we know from personal examination that the cars were constructed in the best manner, and the train in question was made up of good cars. Now it must not be supposed that people cannot be killed in a well built car, or that a well built car cannot go to pieces in an accident. Well built cars are destroyed and people are killed in them, but this is not common. As a rule in a strong, well built car, people are safe in the more common accidents, and it is only in those of a more serious character that people are ever hurt in such cars. Almost any railroad man can tell, in the course of a single year's experience, of dozens of harmless mishaps that, with the cars of the olden time, would have caused loss of life.

It was our intention to have considered somewhat in detail in this article the technique of car building, giving some insight into what are considered by the best authorities the standard methods of construction. This, however, we must defer until our next issue, when we shall give our readers many interesting facts on this subject which we think are not generally known.

The End of the Coal Strike.

After six months of voluntary idleness, involving many sacrifices which, had they been made in a worthy cause, would have been heroic, the anthracite miners have sensibly concluded to go to work again upon employers' terms. We are well aware that miners do not think, as a class, and that they learn nothing from experience, but we presume they realize that, in this instance, they are the only sufferers. They have lost the earnings of about half a year's labor, have squandered the accumulations of previous years of hard and dangerous toil, have acquired bad habits of indolence and vicious indulgence, have given crime a moral support, if not engaged in its commission, and have deprived their families of those necessary comforts of life, without which neither happiness nor health can be enjoyed. And after making these great sacrifices they have gained—nothing. In the first place, the strike was a failure from the outset. It never became general, for the miners of the Lackawanna and West Schuylkill districts refused to join, and the production of those districts was ample to supply the necessities of the market. There has at no time been a scarcity of coal in the general markets, and at the present time, just as the miners so long idle are getting ready to resume, there is plenty of coal at moderate prices, and the market is dull. By the end of the year the production of the country will probably have been brought up to an average of former years, and if a large stock is wanted, it will not be difficult to increase the product of this year over last. It is estimated that the production of anthracite for the first half of the current year will be only about 3,000,000 tons less than that for the corresponding period of 1874. This small deficit can easily be made good. There is always a considerable excess of skilled labor at the mines, and the operators will have no difficulty in accumulating as large stocks as they can carry through the winter. In a word, the miners are the only ones connected with the coal trade who have suffered to any extent from the strike. Whether they will remember this, when next they are urged to strike by the agitators who are always endeavoring to persuade them of the power they gain through organization, is doubtful. As we said before, they do not, as a class, learn anything from experience.

The Statistical Position of Copper.

Stocks in Chili have of late gone on accumulating in consequence of the change which has been effected in the copper trade through the instrumentality of the cable. Instead of shipping off their copper, as they formerly used to do, regardless of whether there was a margin on the operation or not, the Chili houses now prefer to keep a large stock at home, thus steadying prices by maintaining the visible supply in Europe as low as possible. Any favorable change in value can be promptly availed of by shipping the copper, advising it by cable, and having it sold afloat at any given moment. In other words, instead of being at the bidding of the London operators, the merchants of Chili now, to a certain extent, regulate the value of their principal metal themselves.

Irrespective of the quantity available for charter and belonging to the smelting establishments, the merchants were holding back on the coast, May 15, close upon 7000 tons. On the 1st instant there were afloat from Chili for Europe 6100 tons, as advised by mail, and 4200 tons, as advised by cable, making the afloats from there 10,300 tons. By way of comparison we shall not count the afloats by cable, but adhere to the old method of statistics ere the cable was laid, when it will be found that on the 1st of June the European visible supply stood 29,608 tons, against 34,238 in 1874, 38,984 in 1873, 35,495 in 1872, and 43,677 in 1871. But even this favorable exhibit would help the metal but little during a time of crisis, if it did not rest on a stronger and generally admitted basis of an increasing consumption on the other side.

The position of copper on the other side is consequently viewed with considerable confidence here, notwithstanding the recent colossal failures. As it is not dear at present, and as bankers during a period of widespread disaster prefer to hold solid values, there are many who will not hesitate to hold copper for the reasons we have given. More extensive purchases of copper at London for temporary investment could only benefit our own domestic article, since many may prefer to hold Lake copper for being the most desirable kind, and easily shifted back to where it came from, should we materially improve later on. Meanwhile trade in copper in this market begins to feel the effect of the dull times, and leads to no important transactions.

The Nickel Ores of the United States.

The vast importance of the thorough development of all the mineral resources of the United States, when considered in connection with their abundance and variety, has made it a matter of surprise to many intelligent men, both of scientific and commercial pursuits, here and abroad, that we have bestowed comparatively so little attention upon the rarer and more costly metals of our country. In the struggle in which our industries have been engaged, under great competition and frequently under adverse legislation, it is but natural that both capital and energy should have been first expended in the development of the coal and iron of the country, as the readiest method both of accumulating wealth and supplying the demands of trade. With a better geological knowledge of our territory came, however, that of the existence of other metals in abundance, the use of which has so rapidly increased with the progress of civilization as to render their production at once a matter of profit and necessity. While the development of our iron industry was steadily progressing, we have found time, even at the extremely high rates of interest commanded by capital, to extend our labors to other sources of metallic supply, and have already developed these to no mean extent. The copper trade of the United States has expanded into such considerable proportions that we are not only supplying from the Lake Superior copper regions a large portion of our home trade, but are exporting ingots. Other sections of the country are coming into market with copper supplies, and we but recently noted the first shipment of ingot copper from North Carolina to the Baltimore market, which promised, from the excellence of the article received, to furnish in future a regular demand for it. The mining and reduction of zinc ores has for years employed large amounts of capital in New Jersey and Pennsylvania, both in the forms of spelter and sheet zinc, while Missouri has also added greatly to her wealth by the attraction of capital to her borders for the production of this metal. The mining and smelting of lead has also become an important industry, not only to the States of the Northwest, but even to the extreme limits of the Great Basin, where the argentiferous galena of the region is reduced at even comparatively low cost, considering the high rates of labor and cost of fuel incident to that region of country. Tin has, unfortunately, never been found in sufficient quantities to justify its reduction as a commercial industry, although large sums have been spent in searching for it, and no little speculation engendered by reports of its existence, as witness our columns previously. The rapidly increasing demand for nickel in the arts since the discovery of simple and practical processes for its deposition, and the elegant appearance which its use gives to the numerous articles of machinery, tool and shelf hardware, in which it has been used, adds to the surprise which our manufacturers express at learning that comparatively so little nickel is mined in the United States. That the nickel ores of the United States have not been more generally mined has been due to several causes, the most prominent of which are probably the following: 1. That the uses of the metal were, until very recently, but little known in this country, and the demand comparatively small. 2. That the process of reduction was considered as requiring too intricate chemical knowledge and too expensive plant to justify the investment of capital; and, 3. That, as a rule, the percentage of nickel in most American ores, while of about an equal average with those of other portions of the world, appeared so very low to those accustomed to the reduction of the richer metals (in quantity) that the industry was considered of no especial importance. These conditions, however, can no longer be considered to exist, and while it was not surprising that the production of metallic nickel should have been previously almost a monopoly, and a very profitable one also, there is no reason that we should not now extend the area of such production very greatly, to the profit of both producer and consumer. The principal deposit of nickel, or that most extensively worked hitherto, and controlling for a long time the only successful method of reduction in this country, is located in Eastern Pennsylvania, and known as the Gap mines. Here nickel ore has been worked for some years, with, it is stated, an average yield of 1·25 to 1·60 per cent. of metallic nickel, but sufficient other rare metals to greatly reduce the cost of smelting, and in quantity to practically control the supply of the trade—entirely so of the governmental supply for coin purposes. Other veins of nickeliferous ore of greater or less size are found in Vermont; on the Hudson, or near its shores, on both the east and west sides of that river; in the Naugatuck Valley of Connecticut, and at Mine La Motte, in Missouri, where it has also been extensively worked. The Torrington and Granniss nickel mines, of Connecticut, furnish, perhaps, as fair evidences of the nickel ores of the eastern section of the United States as any, and we give herewith very reliable analyses of the same.

These mines have been more or less exploited—in one instance have had smelting works erected, and in both are in immediate connection with railroad communication with chemical works and consuming markets. The veins are reported to be found on high rolling land, convenient to water, and show an average width of from eight to fourteen feet of vein matter. The first analysis given below is from surface ores partially washed, and was made by Messrs. Johnson, Matthys & Co., "assayers and melters to the Bank of England, "her majesty's mint, &c., Hatton Garden, "London," viz.:

Nickel	3·90
Copper	·20
Iron	20·45
Alumina	22·55
Sulphur	12·95
Antimony	·20
Lime	3·30
Silica	30·00
Water	·53
Oxygen	6·05
Loss	·06
	100·00

No. 2 was made by Prof. Chandler, of the School of Mines, Columbia College, New York, from entirely surface ores, and is as follows, viz.:

Iron	23·71
Nickel	1·09
Cobalt	·08
Arsenic	·12
Copper	·59
Sulphur	12·66
Alumina	4·13
Lime	9·30
Magnesia	13·48
Silica	33·43
Oxygen in Oxide of Iron	1·61
	100·15

Equivalent to magnetic iron pyrites containing :

Nickel, Arsenic and Cobalt	30·85
Copper Pyrites	1·71
Hornblende, &c.	67·57
	100·13

No. 5, by same authority, gave :

Iron	27·55
Copper	18·55
Nickel and Cobalt	1·89
Silica, Alumina, Lime and Magnesia	29·43
	100 00

A subsequent analysis by Messrs. Partz & Buck, chemists and metallurgists, gave :

Metallic Nickel	3·90
Oxide of Cobalt	·54

These analyses show more than an average percentage of nickel, with, in one case, an ore rich enough to be worked for copper, and in all, to those familiar with the reduction of nickeliferous ores, no obstacles to their successful treatment.

We are reliably informed that nickel ores of equal average value with these, and in some cases higher in cobalt, were offered some months since in fair supply at 60 cents per lb. for the nickel and cobalt contained in the ore, and $3·50 per unit for the copper, delivered at smelting works. Allowing $3·30 per lb. as the price of metallic nickel, then quotable, this would leave $2·70 per lb. for expense of reduction and profit. The cost of reduction should not, we are informed by experts, exceed 70 cents per lb., which would leave $2 per lb. profit, an amount which we should suppose would abundantly repay any expenditure of capital invested, and create a thriving industry in a much needed product. From time to time discoveries of extremely high grade nickel ores are reported, notably one in New South Wales, in 1874, which, however, has not been borne out sufficiently to affect prices of the product in the world's markets. Experts who have visited all the well known nickel mines of Europe state that very rich nickel ores are never found in large quantities, and that the only reliable supplies of the ore are from large bodies of low grade ores. As stated, the Wharton or Gap mines, of Pennsylvania, are reported to average 1½ per cent., while those of Mine La Motte, Missouri, are stated at not to exceed 2 per cent. nickel. Ores are found in the Hudson sampling up to 7 per cent. nickel, but not averaging above 2½ per cent. in regular workings. These figures may be considered, therefore, to represent a fair yield of the nickeliferous ores of our country, and as also offering at the given price of ore and expense of reduction an industry which should invite capital, and very greatly increase our supply of this useful and ornamental metal. The depression in the trades confined to the grosser metals, the progress and higher plane of metallic industry as applied to the arts, and the large amounts of capital seeking profitable and safe employment, alike invite to the development of the nickel industry. The proper process of treatment for nickeliferous ores is one highly dependent upon the constituents of the ores themselves ; the separation of nickel and cobalt, both substances of great commercial value, is the principal obstacle to success. The reduction of these ores is, however, well known abroad, has formed the basis of princely fortunes in Great Britain and on the Continent, as well as in more than one instance in the United States, and commends itself to capital in this country as a desirable investment.

Coal and Iron in the United States.

Notes of a Visit to Coal and Iron Mines and Iron Works in the United States.*

BY MR. I. L. BELL, F.R.S.

(Continued.)

SIEMENS-MARTIN STEEL PROCESS.

I believe little or no steel was being made in the United States by taking advantage of the intense temperature within the command of the Siemens' furnace. In France, and latterly in this country, an excellent material by means of these furnaces has been successfully made, by fusing pig and wrought iron together ; and more recently the same results have been obtained by substituting ore for the wrought iron in Wales and Scotland. At Cleveland City, on Lake Erie, however, a very powerful mill was ready for starting, to roll plates and bars from steel of this description, to be produced in furnaces in the establishment itself.

BLAIR STEEL PROCESS.

My friend, Mr. T. S. Blair, in company with other gentlemen, has erected a work, near Pittsburgh, for carrying his mode of making steel into practice.

In principle there is no novelty in Mr. Blair's method, which consists in deoxidizing iron ore and melting the iron sponge so obtained in an open hearth with pig iron. The first step in the process has been tried, over and over again, by Clay, Chenot and others ; and Dr. Siemens has, as we all know, paid an immense amount of attention to the second.

Chenot's plan, which I examined at Bilboa, three years ago, consists in exposing a mixture of charcoal and ore to a red heat, in an upright retort, 10 meters high, with a sectional of 1·5 meters by ·40 meter. Each such retort afforded a little over 15 cwts. of sponge per 24 hours. The sponge was afterward sunk in a charcoal fire and made into bars, the waste of metal in the last process being very great.

The consumption of charcoal and fuel was considerable, and did not strike me at the time as a good substitute for the combined action of the blast and puddling furnaces.

Mr. Blair claims great advantages for his apparatus in saving of fuel. Like Chenot, he conducts the operation in an upright retort, but circular in section, 4½ feet in diameter, and 40 or 50 feet high. In the upper 8 or 10 feet, however, is inserted a metal pipe about 3¾ feet in diameter, so that for this distance from the top the working space is an annulus 4½ inches across. Heat produced by burning carbonic oxide obtained from a Siemens' producer is applied to the outside of the retort, and heat is similarly communicated to the inside of the 3¾ feet pipe. Ore and charcoal are charged into the top of the annular space, which is thus exposed to heat from the out and inside, instead of, as with Chenot, having the heat only applied to the exterior. The sponge is retained by Mr. Blair, as with Chenot, in the lower portion of the pipe, which is kept closed until it cools. One such retort as that described gives about two tons of sponge in the 24 hours.

The difficulty which besets this and all other modifications of dealing with iron in so fine a state of division as it exists in the sponge, is its proneness to oxidation. Hitherto it seems to me the direct process, as it is termed, has met with the most success at Landore. The pig iron, after being melted, has blocks of ore thrown in ; the carbon and silicon of the bath reduce the oxide, and the metallic iron is instantly taken up by the bath of liquid metal. Very different must be the action on sponge, which, when thrown into the furnace, will float on the melted pig, and being exposed to carbonic acid at a very high temperature, will, to some extent, infallibly be reconverted into oxide.

So far as I was able to learn, two parts of pig iron and one of sponge lost about 20 per cent. in the furnace. Now, if it be true, as I have heard stated, that a mixture of wrought and pig iron can be fused in an open hearth with a loss of 6 per cent., it follows that a considerable portion of the sponge used in Mr. Blair's process must be re-oxidized.

The specimens of steel I had an opportunity of examining indicate entire success, so far as a mere question of quality in the product is concerned. There seems to be no doubt that, in obtaining the sponge iron, Mr. Blair has made a notable step in advance of M. Chenot, and I am far from wishing it to be understood as expressing an unfavorable opinion on the future commercial merits of the scheme.

THE LABOR QUESTION.

Before bringing my observations on the produce of the American mines and iron works to a close, it may be useful that something should be said on what is, at the present day, an all-important subject.

In an immense territory like that of the United States, great distances and varieties in the general conditions of society render it impossible to lay down any general law of the demand for, and consequent price of, labor. In those localities which had, from circumstances already described, risen to a position of considerable importance as iron-making centers, the late high prices led to a great increase in the activity which had already distinguished them. Fresh immigration was stimulated, and the workmen already employed were only retained by a large increase being made to their pay. This was more particularly observable in the forges and mills, and willingly or not, the malleable iron makers found themselves paying nearly 35/ per ton for puddling, and the rollers were receiving an amount of pay which, in a few years, with care, would place them beyond the necessity of handling the tongs.

Some indication has been given already of the rates earned in various departments and in different localities. I would, therefore, merely observe, in illustration of the above, that while an iron ore miner in the Lake Superior region could earn 12/9 per day, the wages of his class in New Jersey was, at the period of my visit, not much more than half this amount, and in Alabama the miner is satisfied with 4/8. The greatest uniformity of rates of pay I observed prevailed with men working in the pig iron department. Keepers earned from 7/ to 9/6 per day, with the exception of the charcoal furnaces in Alabama, where 4/9 was the price paid for this description of labor. Fillers in the works of Alabama only receive 3/9 against 5/6 to 7/6 in the Northern States.

It must, however, be remembered that the South is still almost entirely agricultural, and that the men engaged in the iron works are, in many cases, the same who wrought there as slaves. After the war all industry was prostrate, employment difficult to be had, and the poor negroes were glad to go on upon any terms the owners of the comparatively few furnaces could afford or were willing to give them. Indeed, there are fair grounds for believing, looking at the remoteness of these Southern States from the great centers of consumption, the iron masters in ordinary times in Tennessee and Alabama can only live by obtaining somewhat cheaper labor.

Blacksmiths and carpenters were earning 7/6 to 8/6 per day, while masons and bricklayers could command 11/3 to 15/ ; indeed, they had received, in 1873, as much as 18/10 ; and at Ironton there was a strike when the builders refused, during that year, to pay their men 20/10 for a day's work. On inquiring the cause of this great discrepancy between the wage of persons certainly no higher in the scale than men working in engine shops, who were earning 6/6 to 9/6 a day, and blacksmiths and carpenters getting even less, I was informed the climate frequently laid builders off work for two, or even three months and more in the winter. This, and the great demand for new manufactories, and the rapid increase of population in many towns, created an excessive demand for labor, which had, moreover, for the cause just assigned, to be performed in nine months out of the twelve.

The rates first quoted, so far above what we are paying in this country, are, however, only of recent date. An eminent iron master in Pittsburgh informed me that ordinary laborers were paid, before the war, 3/4½ per day ; during the war they rose to 7/6½, the present wage being 5/7¾. In the Lehigh Valley, the furnace labor on a ton of pig iron rose from 5/9 to 12/3 during the war ; since that time it has fallen to about 8/6.

As a rule, all over the States there has been, on the whole, a steady increase in the price of wages for the last 20 years. It reached its culminating point during the war, since which time it has receded to its present position of being 50 to 75 per cent. higher than it was a quarter of a century ago.

Coal and iron there, as with us, have fallen rapidly in value, and the conflicts between the iron masters and mine owners with their workmen have been quite as disastrous as they have been in Great Britain.

Puddlers' wages in Pittsburgh rose, during the late war, to 33/11 per ton ; and when it was proposed to reduce them to 30/2, a strike of eight months ensued.

At Troy, during my visit, the men were resisting a reduction of wages, and the struggle continued for some months.

Some little time ago, the miners in the anthracite region were out on strike for six months, and at the present moment operations are again suspended, because the men will not agree to an alteration in their pay, rendered necessary by the greatly altered value of the product of their exertions.

An important item in determining the conditions under which a workman can afford to dispose of his labor, is the cost at which he can maintain himself and his family. Of course, I do not mean that this has to set a limit to what he is entitled to ask for his services ; but before a man fixes to leave his present home for another, his natural inquiry will be whether, in his adopted country, his expenditure will bear the same relation to his earnings that it did in the old one.

Now, there is no doubt that the cost of living, in most respects, in the United States is considerably higher than it is with us. A house built by masons receiving double the wages they do here, is necessarily more costly ; therefore, the rent is necessarily higher. Clothing of every description is more expensive, and was the subject of constant complaint with the English workmen with whom I conversed, at the different places in which I met them.

Food, in the last 25 years, has risen enormously in price, and this, of course, has also added greatly to the cost of living. Professor Cox, of Indiana, gave me the following figures in illustration of this :

	Price, 1850.	1874.
Wheat, per bushel of 60 lbs.	1/3	4/1
Indian corn, per bushel of 56 lbs.	5d.	2/2
Pork, per 100 lbs.	4/8 to 5/8	32/
Beef, per lb.	1d. 5d. to 6d.	

A ready mode of estimating the increased expense of the means of subsistence is the charge for boarding single men. A Middlesbrough man informed me that he obtained as good accommodation for 13/ a week on the banks of the Tees as he could procure for 18/10 on the shores of Lake Erie.

In the autumn of last year, the following were the prices of provisions, contrasted with the rates paid in the North of England :

	United States.	England.
Best beef, per lb.	8½d.	11d.
Ordinary beef, per lb.	6d.	8d.
Butter, per lb.	1/3½	1/4 to 1/6
Best flour, per stone 14 lbs.	2/6	2/
Ordinary flour, per stone 14 lbs.	1/9	1/8
Sugar, moist, per lb.	5½d. to 7½d.	2½d., 3½d.
Coffee	1/1½	1/4
American bacon, per lb.	6½d.	7d. to 8d.

In the United States, generally—I cannot say universally speaking—I believe there is no legislation forbidding the payment of wages in anything but the currency of the country. I found the "store" system in use in different portions of the Union, and in the South, at certain works, the wages of the men were exclusively paid in provisions, clothing and the other necessaries of life. In others, the accounts were kept running for periods of from one to three months, when the balance, if any, was paid in cash.

For this the owners had the excuse that, were it not for the profit—and a very moderate one, it was asserted—they had on the goods supplied to their workmen, owing to the present unremunerative price of iron, they would be compelled to close their establishments. The men, rather than encounter the privations consequent upon such a course of policy, submitted to the conditions, and it is only fair to state that, in my private conversations with the workmen, I did not hear many serious complaints of the manner in which they were treated by the store. This was further confirmed by a rival shopkeeper, of whom I inquired as to the working of the system.

Until the present commercial panic which prevails in America, there is no doubt that in the Northern States, in spite of the disadvantage to which I have alluded, a workman, by careful conduct, will do very well. On Lake Champlain, I met a miner who had, during four years, earned £120 per annum, and being a single man, he lived on £65, laying by the difference, with which he had stocked a small farm ; but I doubt whether during the same period he would not have done equally well in England. This miner informed me that many men, and particularly British immigrants, do not act as prudently as he had done, when they arrive in America—I am sorry to say far from it—and instead, work but short time—pay for their living and clothing, and spend the remainder in drink. This baneful practice is by no means confined to our fellow countrymen ; for although I did hear that to some considerable extent the high wages had led to an elevation in the tastes and position of iron workers and miners, in many instances the only permanent trace of recent prosperity, was the impaired health of the laborers through whom it had been achieved. This information, obtained in the main from the employers, was always confirmed when I had the opportunity of doing so, by appealing to the better class of the men themselves.

PROTECTIVE DUTIES.

There lives in my remembrance but one subject upon which certain of my kind friends in America and myself differed entirely in opinion, viz., that of their system of protective duties. Even here, however, their dissent was communicated in so considerate a manner that I am not apprehensive of a statement of my own views in this place disturbing the friendly feelings which I trust unite us.

I am fully aware how unpopular among a great number of the iron manufacturers on the other side of the Atlantic any relaxation in the present tariff would be ; nay, that they rather seek to add to the restrictions it already imposes. As an inhabitant of England, I feel that nothing we may say is likely to influence public opinion there, for the change in this, when it does happen, must be the result of convictions insisted on by Americans and not by ourselves. Under these circumstances, I trust the warmest partisan for high protective duties will pardon me if I venture to describe the impressions produced on my mind, by what I heard and saw during my visit to the United States in connection with this question, particularly as it affects the iron and its associated trades.

A preliminary observation, when the subject is broached, rises frequently to the lips of American manufacturers, to the effect that we ourselves retained protection to native industry until we felt we were independent of foreign competition, and now that we no longer fear this, and require the necessaries of life for our people, we are found crying out for free trade.

The admirers of a system of restricted commercial policy in America appear to overlook the fact that the chief opponents to its abrogation in this country, thirty years ago, had as much reason to fear foreign competition as any branch of industry in the States need dread the importation of British iron.

I met in Cleveland city a banker who had just returned from the Red River, and he described immeasurable tracts of territory covered with black soil 3 to 5 feet deep, which could be purchased at prices varying from 4/ to 11/ per acre. By means of some instrument, it could scarcely be considered a plough, the surface was broken up to the depth of an inch and a half, and without any further preparation, the farmer obtains 45 bushels of wheat an acre from his purchase.

A railway conveys the produce to Duluth, on Lake Superior, where it is shipped to some one of a great line of grain elevators, from which it is transmitted to the coast for shipment, or indeed, there is no physical difficulty why the vessel which receives the wheat at Duluth, might not deliver its cargo at Liverpool.

At Indianapolis, I was conducted to an enclosure containing 10,000 hogs. From this up an incline plane leading to the top of a huge building, proceeded, one by one, a stream of these animals at the rate of 1600 per diem, the year through, their absence in the enclosure being compensated by fresh arrivals from the country. In a second or two they were pork, and as quickly as salt could do it, they were bacon.

Now, it would not be difficult to picture to oneself the dismay with which an Irish bacon curer, or an English wheat grower, paying ten times the yearly rent that the Red River farmer gives for the fee simple of his land, would, in the early days of our free trade, have contemplated powers so overwhelming as to threaten both with immediate ruin. Instead of this imaginary annihilation, what is the position of the British agriculturist and landowner at the present day ? The farms of this empire, instead of becoming the wildernesses which were contemplated, constitute, in their produce and in the means employed for their cultivation, a proof of our proficiency in agricultural science,

It is quite true it was our own interest, and not any intention to assist in reclaiming far distant lands, which led our legislators, thirty years ago, to introduce that reform in our commercial relations with the rest of the world which has conduced to raise the British empire to its present position as a manufacturing and trading nation.

It would be foreign to the object of this communication were I to attempt to trace the effect of a contrary policy upon the general trade of America ; I shall, therefore, confine myself to quoting what, in my mind, has been some of the results of protective duties in its manufacture of iron.

Soon after 1871 the price of iron, it is immaterial from what cause, commenced to rise in England. At that period something like one-third of this metal consumed in the United States was imported from this country. The change in value with us at once made itself felt by them, and foundry iron, I was informed, was sold at as high a figure as £13, but £10 was the price commonly paid. This remarkable change led to an immediate increase in the blast furnaces, for to the number (571) in existence in 1871 were added no less than 91 new ones by the end of 1873.

Now, as a matter of fact, the price the consumers of iron, who, of course, are far more numerous than those who make it, had to pay, was the already excessive value of the commodity in England, added to the transport to America, *plus* a duty of 23/9 per ton on pig, and 52/10 per ton on railway iron. At this period the profits of the iron masters in the States must have been enormous, and had other circumstances remained without change, they would have been fabulous.

As a rule, the furnace owners there do not possess their own collieries and mines, and, therefore, are purchasers of fuel and ore. The sudden increase of demand for both was not without its effect upon the market, and where this did not suffice to raise the price to suit the views of the owners of coal and iron ore mines, who looked, no doubt, with a longing eye on the lucrative business of the furnace owner, a little of that restrictive policy so much in favor with the latter was promptly invoked.

In the article of coal this was easily managed, at all events for a time. The two great railway companies who command the traffic into the anthracite region, with forethought which does their commercial sagacity infinite credit, and long before the value of this mineral treasure was generally recognized, bought up large tracts of coal lands. Hence, at the present day, to these wealthy corporations is not only intrusted the monopoly of carrying the coal to market, but they are the most extensive colliery owners in the district, and possess, by virtue thereof, an influential voice in regulating the market price of their mineral.

The concentrated nature of this influence enabled these coal proprietors to attach what may be regarded as a fictitious value to their produce, which was maintained by adopting a policy prevalent in the North of England many years ago, viz., that of restricting the output of their pits. This system may have the same fate as it had with ourselves. Under its delusion new collieries were opened out, until the combination became unmanageable, and dearly the coal owners of Northumberland and Durham paid for the artificial stimulus in which they had previously indulged.

If, however, the coal owners were not disposed to permit the iron masters to absorb too large a share of the profits to which they were contributing so important an element, neither were the colliers, without whose help no coal could be had, inclined to allow their employers to retain too large a share of the good things which were going.

At the period when coal was at its highest, the men's ideas of justice were, I presume, realized when their earnings fluctuated from 30/ to 35/ per diem, which was a current rate at the time in question. The lesson of political economy involved in a limited output, elaborated by the coal owners, was not lost on the men. Accordingly, when there seemed a possibility of coal falling in value, and of their wages returning to their former level, the coal hewers determined to create an artificial scarcity by a suspension of work for 30 days.

It was, however, felt by the heads who initiated this movement of a restricted output that it was too dangerous a power to be entrusted to the men, and it was crushed in a summary manner. A lock-out was determined on, which lasted for six months, and to prevent the possibility of any coal finding its way to the New York market, the coal owning railway company, whose rates vary with the price of the commodity they carry, raised their dues to about 37/6 per ton, the usual rate being about one-fourth of this sum. Thus every mine was reduced to idleness. Now, how did the iron masters fare during this complicated warfare ? Upon peace being restored between the coal owners and their men, a sliding scale of wages was agreed upon, the rate being regulated by the selling price of the coal. On the face of it, this might seem reasonable ; but, unfortunately for the furnace owner, this price was adjusted, not by what he could afford to pay, *i. e.*, by the value of pig iron, but by the markets of New York, to which the supply of the article was controlled by the railway company, in its treble capacity of working the pits, of carrying the coal, and of having the power of raising its charges with the value which the mineral brings when sold.

Under this cumulative system, the iron smelters are complaining, and they think justly, of having to bear a weight which their present position renders them, I truly believe, utterly unable to carry ; for by the mode of regulating the trade just described, they are paying for their coal a price which enables the colliery owner to give his miners from 15/ to /18/10 per day of 8 hours. Notwithstanding these, as I conceive, well-founded complaints, the difficulty has arisen from the previous high price of iron to which the protective duty, so much in favor with themselves, has contributed its proportionate share.

(To be continued.)

* Paper read before the Iron and Steel Institute.

Mr. Bell and the Blair Process.

THE BLAIR IRON AND STEEL CO.,
PITTSBURGH, PA., May 25, 1875.

To the Editor of The Iron Age : From a proof copy of the very interesting paper read on the 6th instant before the British Iron and Steel Institute, by their distinguished late president, Mr. I. Lowthian Bell, upon his visit to mines and iron works of the United States in the fall of 1874, I make the following extract. Mr. Bell says, page 47 :

"My friend, Mr. T. S. Blair, in company with other gentlemen, has erected a work near Pittsburgh for carrying his mode of making steel into practice. * * * Mr. Blair's method, which consists in deoxidizing iron ore and melting the iron sponge so obtained in an open hearth with pig iron."

(Page 48). "Mr. Blair claims great advantages for his apparatus in saving of fuel. * * * * The difficulty which besets this, and all other, modifications of dealing with iron in so fine a state of division as it exists in the sponge is its proneness to oxidation. Hitherto it seems to me the direct process, as it is termed, has met with the most success at Landore. The pig iron after being melted has blocks of ore thrown in ; the carbon and silicon of the bath reduce the oxide, and the metallic iron is instantly taken up by the bath of liquid metal. Very different must be the action on sponge which, when thrown into the furnace, will float on the melted pig, and being exposed to carbonic acid at a very high temperature will, to some extent, infallibly be reconverted into oxide. So far as I was able to learn, two parts of pig iron and one of sponge lost about 20 per cent. in the furnace. Now, if it be true, as I have heard stated, that a mixture of wrought and pig iron can be fused in an open hearth with a loss of 6 per cent., it follows that a considerable portion of the sponge used in Mr. Blair's process must be reoxidized. The specimens of steel I had the opportunity of examining, indicate entire success, so far as a mere question of quality in the product is concerned. There seems to be no doubt that in obtaining the sponge iron, Mr. Blair has made a notable step in advance of M. Chenot, and I am far from wishing to be understood as expressing an unfavorable opinion on the future commercial merits of the scheme."

You will, Mr. Editor, doubtless publish the very able and instructive paper of Mr. Bell, and as one interested with Mr. Blair from the beginning in the carrying out of the mode of making iron and steel by the "direct process," I would respectfully ask that you publish this communication, which seems necessary as an explanatory appendix to that portion of Mr. Bell's paper which relates to the "Blair process."

We had the pleasure of a long visit from Mr. Bell in October last (nearly all of his time during his three days in Pittsburgh having been spent with us). Our books, showing the exact amount in pounds of every component of each charge and the resulting product in pounds of every cast of steel made by us (from the beginning), were thrown open to him, and were freely and fully inspected, as well by himself as by his son, Mr. Charles Bell, who assisted him in his observations. Every facility which any of ourselves enjoyed for seeing or knowing what was being done in and about every department of the works, was cheerfully given him ; our object (aside from showing deserved courtesy to so distinguished a stranger) being to enable him to criticise our operations with full knowledge of their details. When Mr. Bell says "so far as I was able to learn," his means of knowing the exact facts were as ample as Mr. Blair's or my own. He saw that never at any time, even for experimental purposes, had we made a cast of "two parts pig and one of sponge." In point of fact, as we never did use pig in any thing approaching the above proportions, neither Mr. Bell nor any of ourselves knows what the loss would be. For the week in which Mr. Bell's visit took place, the average quantity of pig metal used (in eleven casts) was 25 17-100 per cent. of the total weight of materials charged into the furnace, and the last cast inspected by Mr. Bell, and made on Saturday, was composed of 19 3-10 per cent. pig, 53 4-10 per cent. sponge, 18 3-10 per cent. scrap steel, from our own steel, and 9 per cent. spiegeleisen.

A tabulated statement was taken off from the books, which Mr. Bell took with him, of casts made from the beginning (inclusive of the time when we were battling with the difficulties incident to working a new and different melting furnace from that of Mr. Siemens, Mr. S. having at that time refused to allow us to use his furnace unless we abandoned iron sponge, which he himself was then trying to make). This statement shows that of 691,883 pounds of the different metals charged into the furnace 38 32-100 per cent. consisted of pig metal, and the amount of steel made was 589,070 pounds ; showing a loss of 14 86-100 per cent.

The direct process at Landore, to which Mr. Bell refers, is that of Dr. C. W. Siemens. Dr. Siemens uses his ordinary open hearth furnace (not the rotator), and the steel is good enough for railway rails, and is used for that purpose ; 1000 tons of rails per week being about the average product.

The materials consumed in making 2240 pounds of steel in the ingot amount to 2961 pounds on the average, and consist of 1517 pounds Bessemer pig, 197 pounds spiegeleisen, 706 pounds scrap steel, 541 pounds of ore (a 60 per cent. ore)—2961.

Mr. Bell correctly describes the operation thus : "The pig iron, after being melted, has blocks of ore thrown in. The carbon and silicon of the bath reduce the oxide, and the metallic iron is instantly taken up by the bath of liquid metal."

Mr. Bell, however, adds : "Very different must be the action on sponge, which, when thrown into the furnace, will float on the melted pig, and, being exposed to carbonic acid at a very high temperature, will, to some extent, infallibly be re converted into oxide."

When Mr. Bell was at our works, he witnessed the fact that the iron sponge, when thrown into the furnace, did not float on the melted pig, and as it plunged and remained underneath the surface, protected by the covering of slag, it was not exposed to the highly heated carbonic acid, and was, therefore, not oxidized to an undue extent. This remarkable and interesting fact was noticed and commented on with much pleasure by Mr. Bell at that time, as it had previously been a source of satisfaction to ourselves, controverting, as it did, the theory of all, and the experience of most, parties.

If you will permit me, I will remark that, if Mr Siemens would first convert his 60 per cent. ore into iron sponge, and make it the principal ingredient of his charge, instead of the higher priced and more deleterious pig metal, his ingots would cost him less per ton, and instead of being useful only for rails, would command £5 per ton more, and could be used, as the Blair steel is, for all purposes, from homogeneous metal up to tool steel.

My object being, however, to make some necessary corrections of errors in the paper of Mr. Bell, I would ask of you the favor to give this communication the same publicity you do that "paper." Very respectfully,

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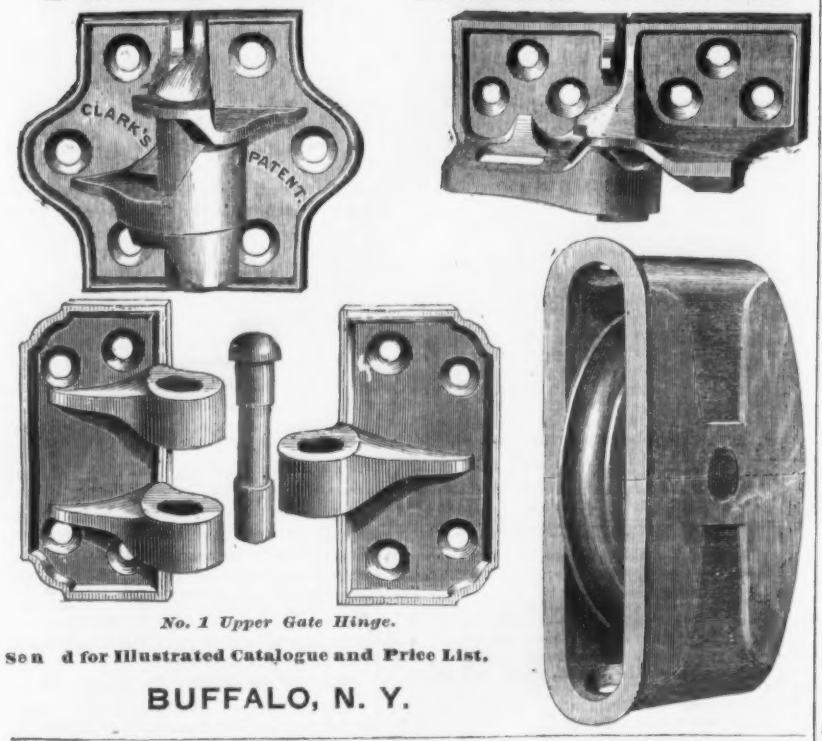

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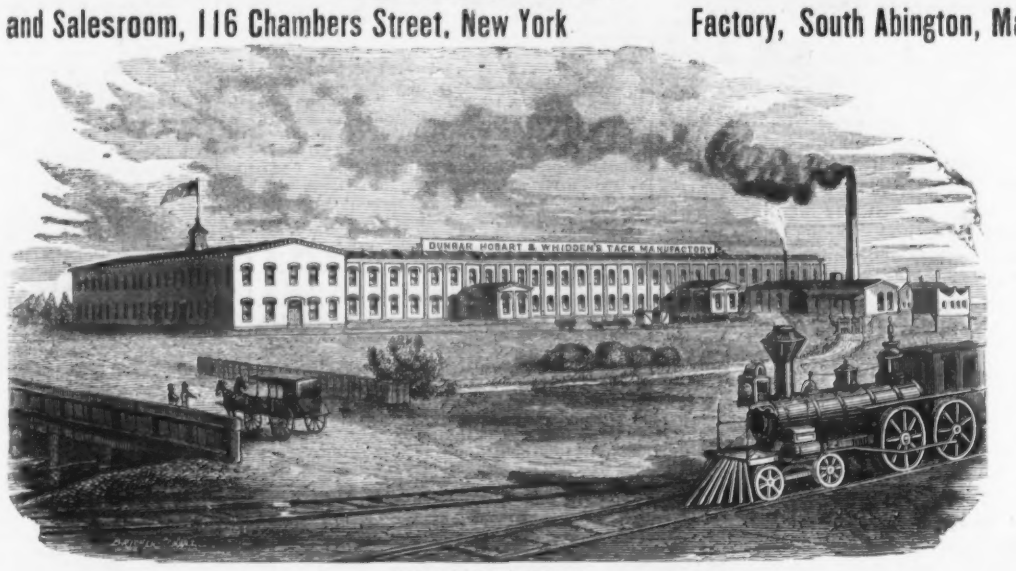

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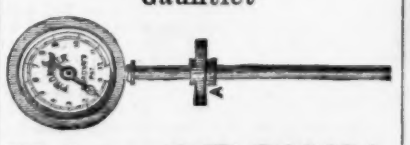

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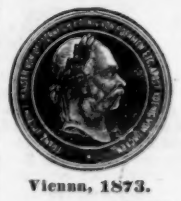
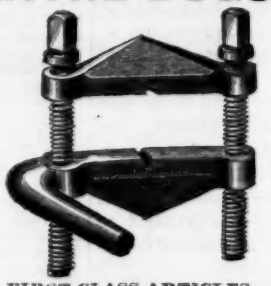


Vienna, 1873.



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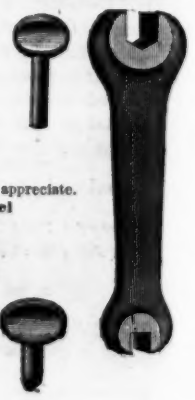

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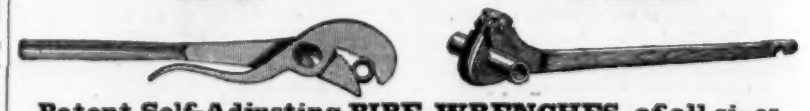

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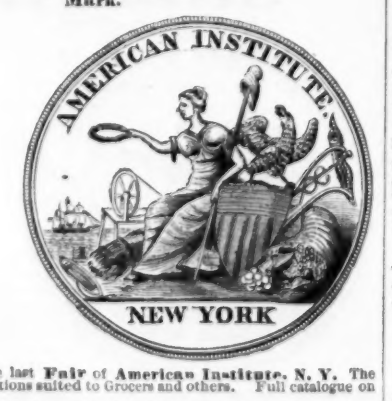

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The Kazetl Direct Process.

We abstract the following from a treatise published by Gustav Kazetl, of Newberg, on the direct process for the manufacture of wrought iron and steel directly from the ore:

All the direct methods heretofore proposed started with the preparation of an iron sponge by intimately mixing the ore with coal and heating this mixture. This sponge was afterward, either in the same or a separate furnace, subjected to a greater heat, whereby it was fused and separated from the adherent slag. C. W. Siemens was the first to call attention to a new method, and in his cascade furnace brought into use a really new principle, for he sought to reduce the fused ore by intermixed coal. It requires no special explanation to show what an advantage this kind of "precipitation" of the metallic iron out of the hot melted bath would offer for a better separation of the slag; and, moreover, in the cascade furnace the slag being specifically lighter would collect on top and protect the reduced iron from burning. Unfortunately, Siemens himself gave up his experiments with this furnace, because the production was variable, and depended very much on the skill of the workmen. Principally on the latter ground he conceived of a furnace more machine like in its operation, called the "Rotator."

A long study of the Siemens' rotary furnace in Birmingham has convinced the author that a fusion does not preceed the reduction of the ore, but, on the contrary, the reduction takes place during the mechanical mixing at a red heat, and is finished before the slag melts. Consequently, there is formed just as in other direct iron processes a dry iron sponge intimately mixed with slag, and in balling this together a rich ferruginous slag is formed.

The fusion of the ore, although possessing so many advantages, is not alone sufficient to insure a perfect reduction, as long indeed as solid carbon in the form of fine coke, pit coal, charcoal, anthracite, etc., are employed. In the first place it is difficult to mix this kind of carbon with the fused ore, on account of its being readily reduced to dust, and also specifically lighter. In the second place, when reduction is accomplished with solid carbon, there is such an absorption of heat that the *precipitation of metallic iron in a liquid state, and a good separation from the slag, is not possible.* In the author's treatise he proves this, and also shows that the desired end of separating iron in the metallic state could not be attained by a stronger heating of the ore, since an enormously high temperature would be required (4820° C).

The case is quite different if the reducing agent be changed, and instead of carbon, reducing gases, like carbonic oxide, the hydrocarbons, etc., be employed.

If we select carbonic oxide as the reducing agent, and force a stream of this gas up through a bath of the fused ore, like air is driven through the iron in the Bessemer process, an intermolecular combustion of the carbonic oxide to carbonic acid will take place at the expense of the oxygen of the ore, and a consequent reduction of the ore.

No absorption of heat results from the reduction of iron ore by means of carbonic oxide, since in the conversion of carbonic oxide into acid there is just as much heat generated, per weight-unit of oxygen taken up as is absorbed by the reduction of the iron ore; the quantity of heat previously present in the bath of ore is, therefore, neither increased nor diminished by the reduction, and remains available for the fusion of slag and iron.

On the ground of these theoretical views, which are more especially described in his treatise, the author took a patent for the "reduction of fused iron ore by means of introducing reducing gases," the specifications of which have not yet been made public. (*Oesterreichische Zeitschrift fur Berg-und Huttenwesen*, 1874, No. 49.)

At a session of the Montanistic Union of Steiermark, held in Leoben, Dec. 12, 1874, Kazetl's process was discussed at length.

Prof. Kupelwieser referred to a theoretical discussion of this process published by him in Nos. 50 and 51, *Oestr. Zeitschr.* and gave the following resume of its chief points:

Suppose that iron or steel is produced in a liquid state, for without this we cannot expect an economical advantage, there is one essential disadvantage of this process, namely, a considerable amount of heat would be taken away from the metallic bath by the reducing gases, and this quantity would be larger just as the quantity of gas employed increased. If, however, there is only, or chiefly, protoxide of iron in the bath, and no sesqui-oxide, which, from the high temperature and the method of fusion, may be supposed and also striven for, this loss of heat can be in a certain degree neutralized. First, by strongly heating the reducing gases, and second, by superheating the bath of ore, which is the more advisable, as the rapidity of the process leaves little time for external heating.

But when both these precautions are taken it may be difficult, even if it is possible, to obtain the precipitated iron, which is reduced and not carbonized in a fluid state. This disadvantage might be remedied by the introduction of over heated carbureted iron, like spiegeleisen, after the reduction, whereby a corresponding degree of carburation could be imparted to the whole product.

A further disadvantage consists in this, that at the beginning and end of the process we have to deal with different sorts of silicious slag which require different linings. For this reason it is advisable to conduct the fusion of the ore and the precipitation of the iron in two different receptacles made of different material.

From this it is to be understood that the process is, to be sure, practicable, provided on the one hand that the mechanical difficulties can be overcome, and on the other that really all the carbonic oxide gas is employed for reduction.

Director Sprung doubted whether the process could be carried out economically in competition with the combined blast furnace and Bessemer process, which he considered the most direct conceivable method for the manufacture of wrought iron from the ore. Still he recognized the theoretical correctness of Kazetl's ides, and since the chief difficulty—obtaining and maintaining the high temperature—was undoubtedly greatly diminished by using, as reducing agent, a gas free from nitrogen, instead of the ordinary generator gas, which contains so much nitrogen, he communicated a paper from Jos. Swoboda, of Hammerstadt. In this paper was described the production of a mixture of carbonic oxide and hydrogen gases by conducting steam over coal or charcoal heated to redness in an iron gas retort.

We take the following from the communication of von Turner, president of the union:

The direct manufacture of iron from a hot bath of fluid ore, chiefly by forcing in carbonic oxide, is not altogether new, as will be seen from a discussion which took place in London in the latter part of April, 1873, at a meeting of the Iron and Steel Institute, and which is described in the journal of that Institute, vol. I. On page 65 it is stated that Mr. Jones, of Middlesbrough, had attempted first to bring the ore to the liquid state, and then to force carbonic oxide gas through this bath, instead of using solid carbon. On page 72, Bessemer stated that he, too, had attempted the reduction of oxide of iron ores, mixed with lime, in a fluid state, not only by mixing pulverized coal with it, but also, in three or four experiments on a small scale, by forcing carbonic oxide gas into the ore in an apparatus similar to his movable converter, but that illness had prevented his continuing his experiments.

On page 78, Dr. Wright expressed well-founded doubts of the possibility of effecting a saving of fuel by this direct process over the blast furnace. He spoke especially in regard to the reduction with gaseous carbon, that a great excess of carbonic oxide must be present, because otherwise the reducing action of this gas would not only be lessened by the carbonic acid formed, but in fact an oxidation might take place on account of this carbonic acid. On page 81, Bell likewise refers to the fact that a mixture of carbonic oxide and acid has a reducing or oxidizing action upon iron, according as the one or the other predominates, and that in the blast furnace just those conditions prevail under which the greatest effect of the coal, or carbonic oxide, is obtained, compatible with the nature of the process.

Finally, on page 85, Dr. Siemens remarked that he, too, had attempted to force carbonic oxide through a hot fluid ore bath, so as to reduce the iron, but that he had not been able to obtain any satisfactory results in this way, because a large quantity of gas was required for the reduction, and this cooled down the bath of ore so much that the further operations were interrupted. For this reason, in all subsequent experiments, he had only employed solid carbon. He maintained that in his manner of conducting the process, where the pulverized ore charged into the rotator was first brought to a full red heat, and then the pulverized coal was put in and the rotation made more rapid, the formation of metallic iron and the fusion of the earthy portion of the ore with the flux would take place simultaneously, which he himself declared was the chief condition for obtaining a pure bloom. It is just this which constitutes the essential difference between his process and those of Chenot and others.

After this discussion of the subject in question, there can be no great hopes of a happy solution of the problem of preparing iron direct from the ore by Kazetl's method. Still there are several of the circumstances in question which are very doubtful, and others which are by no means at rest, so that we are not to give up all hope of its success. Although the bath of ore would be considerably cooled by a large quantity of ordinary generator gas mixed with so much nitrogen, &c., it remains to be ascertained how the temperature would be affected by the use of gas obtained by distillation or from steam and red hot coals, and containing less nitrogen, and also if this was heated as much as possible before it was used in the regenerator. Nor must it be overlooked that in conducting the process in a Siemens' furnace, heat is constantly added to the bath.

Kazetl intends to perform the fusion of the ore, keeping the metal and slag in a perfectly liquid state, as well as to regulate the quantity of carbon in the iron, all in one and the same Siemens furnace. The fusion of the ore and the subsequent precipitation of the iron shall, however, take place in charges of 5 to 10 cwt., following one after the other, and the slag remaining after each charge be drawn off. In this way too great a cooling down would be avoided, and the action of the heat on the metal bath be accelerated. Some cast iron may be smelted with it both at the begining of the process, to prevent the difficulty of fusible iron beginning to solidify on the deep hearth, and at the end of the process to regulate the amount of carbon in it. The hearth should be made of bauxite or even pure lime, instead of quartz, and the reducing gas be introduced in the same manner as steam is introduced in the so-called steam puddling. The final product should be tapped and drawn off into receivers as in a common Siemens furnace.

According to the observations of Dr. Kraus, of the quantity of heat obtained from the fuel employed in an ordinary flame furnace, only about 7 per cent., and even in a regenerative gas furnace 15 per cent., is actually used, while the useful effect in a blast furnace reaches 60 per cent. When we consider this it will be evident that, in spite of the loss of fuel by coking, &c., it must be very economical to employ a stack furnace, whenever possible, for fusing ore. An ordinary stack furnace could hardly be employed for this because it would be difficult to avoid at least a partial reduction of the iron. A hearth similar to the English fining hearth could be built with an igniting furnace, like a stack furnace, attached to it behind, and this might lead to the desired result, because such a smelting apparatus would require little repairing, would cause the combustion to extend to carbonic acid, and would utilize the greatest possible percentage of the heat generated. From this smelting hearth the bath of ore would be drawn off periodically into the Siemens furnace, where the reduction and precipitation of the iron is to take place.

In regard to the production of purer reducing gases, we would refer to the extensive experiments of Tessie du Motay, in Comines near Lille. He obtained better gases by passing hot steam down through a shaft furnace filled with glowing coke, and conducted away the gases formed from the bottom; when the glowing coke was almost extinguished, the steam was shut off, fresh coke added above, wind blown in below, and the coke again brought to a glow. To obtain a continuous current of such gases, principally carbureted hydrogen and carbonic oxide, there must be two such furnaces in action at the same time, so that the coke can be reignited in one while it is being extinguished in the other. Tessie du Motay has fused platinum in a furnace fed with these gases, according to the testimony of an eye-witness.

In conclusion Tupner moved that the committee of the Montanic Union, of Steirmark, decide to give as its verdict, in regard to Kazetl's process for making iron and steel directly from the ore, that although in carrying it out many difficulties would have to be encountered, a favorable result could not be denied it, and hence the continuance of the experiments are most warmly recommended, and the more so because the cost of the first experiments are relatively not very large. The motion was carried unanimously.—*Oesterr. Zeitschr. J. Berg-und Huttenwesen.*

Iron Making in the South—Cost and Quality of Coke and Charcoal.

CARTERSVILLE, BARTOW CO., GEO., June 12th 1875.

To the Editor of the Iron Age: I have assumed that the manufacture of hot blast iron in the South has already gone beyond limits where it can be profitable. The practical point is that the hot blast irons of Alabama do not bring any more price in Cincinnati or Louisville than coke made irons—that the Chattanooga Iron Company can and does get as much for its Coke Foundry No. 1 as any of the Selma Rome and Dalton furnaces for their Hot Blast Foundry No. 1. The question arises, then, can these large furnaces afford to run as cold blast thereby getting the higher price? It is my belief that they cannot; then we may assume that when charcoal gets so distant as to have to be hauled 3½ to 4 miles they cannot afford to make hot blast or any other charcoal iron. Assuming a make of 18 tons per day, and a consumption and waste, therefore, of 2200 bushels of charcoal, to make which we assume a yield of 40 bushels to the cord, and 27½ cords to the acre, and two acres per day is demanded of wood, in a 300 days' run 600 acres—very near one square mile, and ten square miles in 10 years. There are now but few if any furnaces which have at their command, within a radius of four miles, ten square miles of wooded land, and I am sure none on the Selma, Rome and Dalton Road, and all but Shelby and Brierfield are located in a hilly section of country. I have given the very best yield of coal to the cord in pits and a fair consumption per ton of pig made. To haul their wood to pits and move the coal to furnace roads must be made, frequently at a great expense. An experienced iron man and first-class worker gave me the following figures as what he did and could make charcoal by close attention. He assumes 3 cords to the 100 bushels, and a haul of two miles. His figures are:

Cost of wood in tree (3 cords)	$ 45
Cutting	1·50
Hauling wood	·45
Leaves, gathering and hauling	·11
Use of tools, hearth, etc	·25
Burning	1·50
Superintendence	·16
Boards, etc.	·08
Hauling to furnace	1·50
Total for 100 bushels	$6·00

Of course a furnace owning its land, and having it in as stock, could drop off the 45 cents cost of wood. Every half mile farther will add near 50 cents per 100 bushels. Beside the gentleman has put in nothing for new roads or keeping old ones in order, especially in clayey sections. I think that assuming 7½ cents as the average cost on the S. R. & D. R. would be fair; that is, at 110 bushels to the ton, $8·25.

The nearest coking coal now mined is 20 miles from Colera, up the South and North Road in the Cahaba field. This is mined at 3 cents per bushel of 80 pounds, 1½ cents more will burn it, and a run of 120 miles put it to Tecumseh, the farthest of the large furnaces. Hence we have to produce 90 bushels of coke:

Mining 80 bushels coal (3 cents)	$2·40
Burning	1·35
Railroad 120 miles	2·00

Total, $5·75 for 90 bushels, enough to produce one ton of pig iron; or if furnace company do not own the coal, then 2 cents more for profit, or $7·55. Hence we have for a ton of pig made each by charcoal and coke: Coke, $7·55; ore, etc., $3·50; labor, $4=$14·04. Value in Cincinnati, $28. Charcoal: $8·25; ore, etc., $2·50; labor, $4=$14·75. Value in Cincinnati, $28.

I think the labor in the coke furnace might be made lower than on hot blast charcoal. The yield of iron would also be larger, and I have put the charcoal at low figures. There are also veins of good coal nearer these furnaces than the point named. At any rate, whether those now built shall deem it economy to go on to coke, it is evident that coke iron can now be made on the Selma, Rome and Dalton Road cheaper than hot blast charcoal, that the latter will be getting more costly every year, that the coke is worth just as much in the market, and that the use of the immense beds of brown hematite on that road should be in that direction.

But in point of transportation to market the furnaces on the S. R. & D. R. R. cannot compete with those on the Western and Atlantic. The cost of coke to Bartow furnace is now 12 cents per bushel, and I have stated that when the Cincinnati Southern Road is built they will get it for 9 to 10 cents. The Dade mines are on the Nashville and Chattanooga Road, about 20 miles from Chattanooga. The coal, unfortunately, is slaty, and will have to be washed to make first-class coke, but even then it can probably be put on the market cheaper than any other coal now mined. The Suwanee Company mine their coal, coke it and transport to Cowan on their own road, thence to Chattanooga on the N. & C. about 60 miles, and sell it there at 10¾ cents per bushel. They claim to deliver their coal at Cowan at a cost of only 5¾ cents per bushel, hence at the Chattanooga price named there must be profit. Freight on the N. & C. is about 75 cents per ton for the distance run. The Suwanee coke has proven to be as good an iron making coke as any in point of purity, but it is evident that they must reduce the cost. The Dade coke should be put in Chattanooga for a freight of 50 cents per ton, and beyond, at 75 cents for 50 miles, and $1 for 100 miles. The ton here meant is the railroad one of 50 bushels of 40 pounds each=2000 pounds. Hence, Dade coal can be delivered from the mine, say, to the iron ores near this place at 3 cents per bushel, or $2·70 for a sufficient quantity to make a ton of iron. At present this coal is mined and coked for about 2 cents, slack being used; add 2 cents for proper treatment, and we have a total cost at Cartersville, say, of 7 cents per bushel. Here it would meet the cheap and rich ores from Guyton Hill and smaller beds up the Iron Valley.

In discussing the above we have seen that it is possible to deliver cokes, without counting profit, in Chattanooga at 5 cents per bushel. As we go up the Cincinnati Southern Road we come to a region where, with proper location, a minimum price of 4 cents per bushel may be reached. This is because the coal is easily and cheaply mined and makes a good coke, averaging an increase in bulk of 20 per cent. Beyond Emory Gap, where the railroad starts north through the mountains, for many miles are equal advantages as to coal and iron ore, but as yet no prospects of transportation. At Coal Creek the seam of coal at present worked has not made good coke, but it is known that above it are good coking coals, and also one seam excellent for working raw. Transportation to market is also poor and costly.

As to the qualities of these coals, analyses are somewhat uncertain, but they are at present our only guide as to the Alabama coals. Two analyses I have from the Cahaba field give:

1st. Carbon, 80·96; Volatile matter, 13·96; Ash, 6·00.
2d. " " 84·09; " " 13·24; " 1·75.

I regret that I have none from the Warrior field that I consider a coking coal. Dade coal gives (an old analysis): Carbon, 76·45; volatile matter, 9·75; ash, 11·05. I have no analysis of Suwanee now before me, but it is about the same as Dade. The analysis given above was from near the surface; the mine is now worked far under the mountain, and the coal is better. The Walden's Ridge coal, as worked at Rockwood, shows: Carbon, 76·39; volatile matter, 16·30; ash, 6·65; sulphur, 0·33. This is a fair sample of the coal which exists for 40 miles along the Cincinnati Southern Road, and north of Emory Gap for full 40 more. The horizontal vein worked at Coal Creek is a rich bituminous gas or a grate coal, breaking into cubes and standing transportation very well. Dade, Suwanee and the Walden's Ridge coal are all disposed to be friable and have no distinctive fracture—rather inclined to scales. They contain but little sulphur. That derived from the Etna mines has so far contained too much sulphur to become permanently a favorite as a blast furnace coke. In grading the C. S. R. R. seams have been opened which have the appearance of good coking coals, and experiments in a small way prove them to be such, and if so they can be delivered in Chattanooga at cheap rates—75 cents to $1 per ton. The Suwanee, Dade and Etna companies all use the simple bee hive oven, and it is believed that with washing the coal they will make near as good a coke as Connellsville. A Belgian oven erected at Rising Farm had not proven a success at the time of my visit. The bee hive is simple and easily worked by unskilled labor; hence the thing for this region.

It may be assumed, therefore, that a coke approaching very near if not full as good as Connellsville can be delivered to Cartersville for 7 cents, to Chattanooga for 6 cents, to a furnace say at Emory Gap for 4 cents per bushel that parties on the S. R. & D. R. R., owning their own mine can, for many years, get good coke at 6¾ cents, while their charcoal, now 7 cents, will be continually increasing in cost. At the same time, while these necessities to iron making can be gotten at these prices, they are not now so sold, and it remains to be seen if the mines will afford them at those rates. They have yet to learn that a country is more benefited by doing a large business on a small profit than a small business on a large profit. The Suwanee Company deserve praise, however, for their attempt to carry out the first plan, but nature has placed great obstacles in their way.

With coke delivered in this town at 7 cents per bushel, pig iron could be made as follows, using the ore of the Guyton Hill, and supposing it to be brought in by a narrow gauge road:

Coke, 90 bushels	$5·40
Ore (62 per cent.) 1¾ tons ($1·50 per ton)	2·62½
Labor	4·00
Limestone	·50
Contingencies	1·50
	14·02½

On the line of the C. S. R. R., say at or near Emory Gap, ore will cost more here as it has to be mined from a vein. We have:

Coke, 90 bushels	$3·60
Ore, 1¾ tons, at $2·00	3·50
Labor	4·0
Limestone	·50
Contingencies	1·50
	13·10

From Cartersville there is equal facility to Louisville and St. Louis, but to Cincinnati the Emory Gap or Walden's Ridge region would have an advantage. Of the quality and quantity of these ores I shall speak hereafter; at present it may be said that with all these possibilities of cheap iron, the South has not so far placed any coke iron in Northern or Western markets cheaper than it is now produced in the furnaces of those regions. It can only do so in the future by a new system of management and the economy which "tight times" has learned the Pennsylvania furnace man.

To save themselves, the Suwanee Company must reduce very materially the price of their coke or erect a furnace at Cowan. I claim that they cannot do this at Tracy City, because they have not now more water than their coal operations demand. They make coke mostly from slack; they now deliver their lump coal, highly esteemed as a steam and rolling mill coal, at Cowan for not over 5¾ cents per bushel; they can deliver coke there, including the cost of burning, at 6 cents. Suppose they deliver coke to a Georgia furnace on the Western and Atlantic Road and receive ore in return, as they own the cars in which their coke is transported, freight to them is cheap. We can safely estimate:

Coke, 90 bushels, at 6 cents	$5·40
Ore, 1¾ tons, at $3	5·25
Limestone	·50
Labor	3·00
Contingencies	1·50
Total	$15·65

Thus it is evident that the Suwanee Company, by a double use of their cars, can make iron very cheaply, and also have 30 cents to $1·50 advantage in freight of the pig. I have placed them in the W. and A. Road, because freight to the S. R. and D. would be higher.

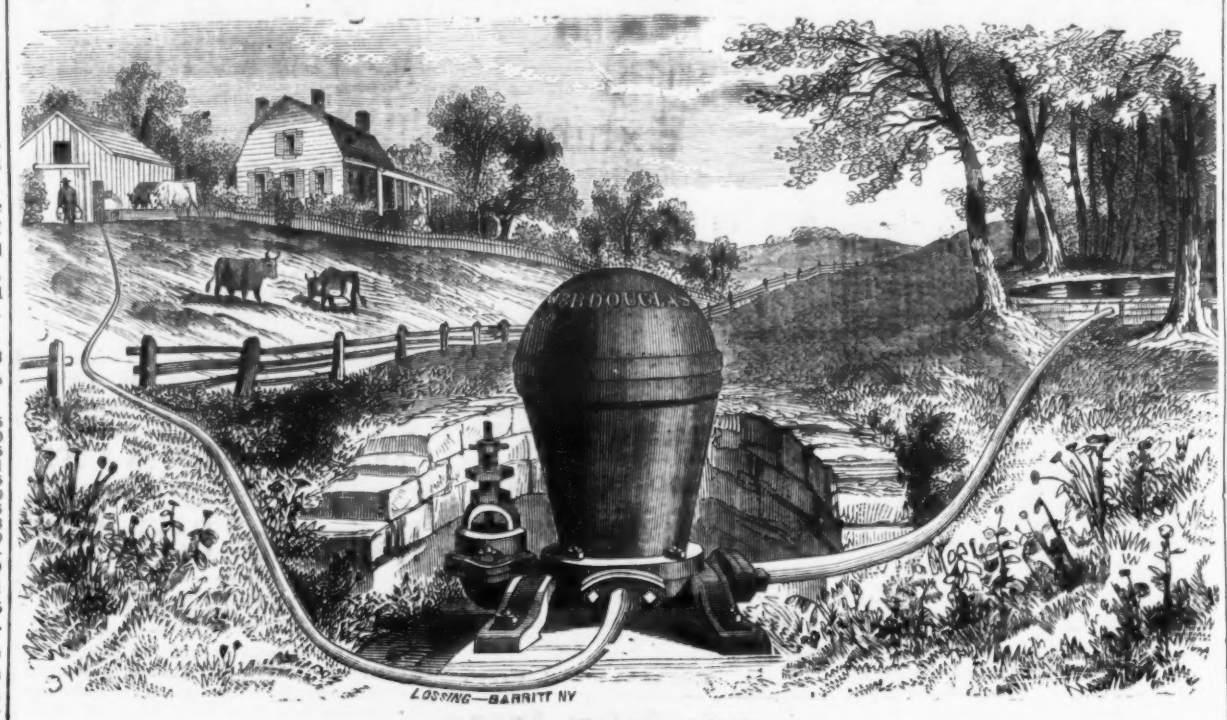
Now, I admit that at this time there does not seem to be any need for the production of more iron, but if so at all, the demand is for good iron at a small cost. What is being done can be gathered from my past letters; what can be done is shown in this, and so high an authority as Lowthian Bell shows that coal can be thus cheaply produced in the South. If the coal men determine to sell their coke at these low rates, the following would be the cost of pig made at the places I have indicated, and delivered in Cincinnati:

	Cost.	Freight.	Total.
Cartersville	$14·02½	$5·00	$19·02½
Emory Gap	13·10	3·50	18·60
Suwanee	15·65	4·70	20·35
Tecumseh	14·05	5·60	19·65

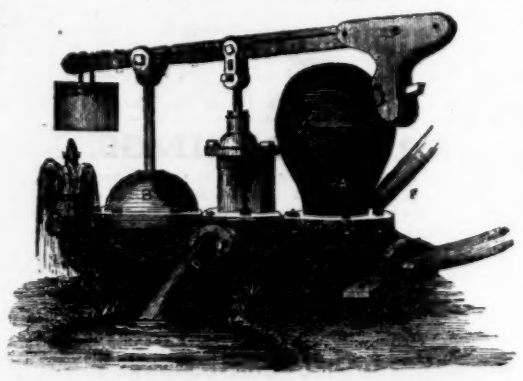
Whether iron averaging No. 2 foundry will pay a profit if delivered in Cincinnati at above prices, is a point I leave my reader to calculate.

HENRY E. COLTON.

Russian Manufactories.—A report recently presented to the Technical Society of St. Petersburg shows that a large portion of the manufacturing establishments of Russia are in the hands of foreigners. In the district of St. Petersburg, for instance, foreigners possess 28 out of 32; in the province of Moscow, 22 out of 47; in the district of the Vistula, 6 out of 14; and in the Baltic provinces, 21. The total number of works for the construction of engines in Russia, without counting the Imperial establishment, is 167, three-quarters of which number make locomotives and other railway plant, while the remaining quarter constructs agricultural engines and appliances, and other machines. The larger portion of the establishments is situate in Poland; next in order come the Baltic provinces, then the provinces of the center and of the south. The 167 establishments possess 422 engines and 476 boilers, of a total force of 6162 horse-power, employing 41,382 workmen. These establishments consume yearly 133,800 tons of pig iron, 164,898 tons of wrought iron and 127,000 tons of fuel, of which about 100,000 tons consists of coal and coke.



HYDRAULIC RAM SET UP.—*Fig.* 1.



HYDRAULIC RAM ENGINE.—*Fig.* 2.

W. & B. Douglas' Hydraulic Ram.

We take the accompanying cuts from the catalogue of Messrs. W. & B. Douglas, of Middletown, Conn. The first cut illustrates a hydraulic ram in operation. The principle upon which the hydraulic ram works is the raising of a small quantity of water to a considerable hight by the force of a larger quantity flowing from a smaller elevation.

In many country and village houses the transport of water for culinary purposes is of daily occurence, and that, too, in places where nature has provided running streams that would be ample to lift the water to any reasonable elevation. The number of situations where this can be successfully done, and at a reasonable expense, is greater than is generally supposed.

The various uses of the ram are obvious, viz.: For the purposes of irrigating lands, supplying dwellings, barnyards, gardens, factories, villages, engines, railroad stations, etc., with running water. The simplicity of the operation of this machine, together with its effectiveness and very apparent durability, renders it decidedly the most important and valuable apparatus yet developed in hydraulics for forcing a portion of a running stream of water to any elevation, proportionate to the fall obtained. It is perfectly applicable where no more than 18 inches fall can be had; yet the greater the fall applied, the more powerful the operation of the machine, and the higher the water may be conveyed.

The relative proportions between the water raised and wasted is dependent entirely upon the relative hight of the spring or source of supply above the ram, and the elevation to which it is required to raise—the quantity raised varying in proportion to the hight to which it is conveyed with a given fall; also, the distance which the water has to be conveyed, and consequent length of the pipe, has some bearing on the quantity of water raised and discharged by the ram, as the longer the pipe through which the water has to be forced by the machine, the greater the friction to be overcome, and the more the power consumed in the operation; yet it is common to apply the ram for conveying the water distances of one and two hundred rods, and up elevations of one and two hundred feet. Ten feet fall from the spring or brook to the ram, is abundantly sufficient for forcing up the water to any elevation under, say, 150 feet in hight above the level of the point where the ram is located; and the same 10 feet fall will raise the water to a much higher point than above last named, although in a diminished quantity in proportion as the hight is increased. When a sufficient quantity of water is raised with a given fall, it is not advisable to increase said fall, as, in so doing, the force with which the ram works is increased, and the amount of labor which it has to perform greatly augmented, the wear and tear of the machine proportionately increased, and the durability of the same lessened; so that economy in the expense of keeping the ram in repair would dictate that no greater fall should be applied for propelling the ram than is sufficient to raise a requisite supply of water to the place of use.

To enable any person to make the calculation as to what fall would be sufficient to apply to the ram to raise a sufficient supply of water to his premises, we would say that in conveying it an ordinary distance of say 50 or 60 rods, it may be safely calculated that about one-seventh part of the water can be raised and discharged at an elevation above the ram, five times as high as the fall which is applied to the ram, or one-fourteenth part can be raised and discharged, say ten times as high as the fall applied; and so in that proportion as the fall or rise is varied. Thus, if the ram be placed under a head or fall of 5 feet, of every seven gallons drawn from the spring one may be raised 25 feet, or half a gallon 50 feet. Or with 10 feet fall applied to the machine, of every fourteen gallons drawn from the spring, one gallon may be raised to the hight of 100 feet above the machine, and so in like proportion, as the fall or rise is increased or diminished.

The cut shows the ram as set up in operation, except that it should be placed down in a pit two or three feet deep, sufficient to cover it from frost, with a race-way or ditch running from the pit to carry off the waste water, and the pipes properly covered under ground, so as to be out of the way of frost or other injury.

It will be seen that the spring, brook or pond from which the water is taken by the drive pipe to the ram, is represented as being in the clump of trees at the right of the plate. The drive pipe (from spring to ram) should ordinarily be about 25 feet in length, and of size adapted to the capacity of the ram. A medium head or fall, to place the ram under, is about 8 feet; yet this may be varied according to circumstances. The pipe above shown as coming out at the front of the cut of ram is the discharge pipe, which conveys the water to place of use, and is required to be only about half the diameter of the drive pipe.

There are many situations, however, in which the running stream, though having an abundant fall, is not good for drinking or fit for use about the house. This is frequently the case, and people say that they cannot use the hydraulic ram because, although the water is abundant, the quality is bad. Here Messrs. Douglas step in and give us a Hydraulic Ram Engine, or an engine in which the hydraulic ram is made to work a pump. This engine is shown in Fig. 2.

This machine is designed for applying to a small stream or run where there is some 3 or 4 feet fall, or more, by which it may be operated to force up another kind of water from that which drives it. Thus it may be applied to a brook, and be operated by that to force up pure well or spring water from another fountain. Being driven by one kind, and at the same time forcing up another kind of water, it is rendered of value where there is a running stream with some fall near a fine spring or well, as by the application of this machine all the water from the spring or well may be forced up to any point required for use. With 5 feet fall applied as driving power from the brook or run, it will raise through the suction pipe some 10 to 15 feet high, and force the pure water up an elevation of some 25 or 30 feet above the pump at the rate of about 1½ pints per minute. It will force greater hights in less proportion, and less hights in greater proportion

Some improvements in this machine have been made not shown in the cut. It now has two impetus valves and a brass cylinder and piston in the place of the globe and diaphragm, as represented, to apply the power to the working lever.

By means of the hydraulic ram engine a stream, no matter whether of drinking water or not, can be made to furnish a stream of pure water taken from a spring or well, and deliver the water at any reasonable hight. We think it deserves to be more generally known, for it would be very useful in many places where no other form of ram is applicable.

Spanish Locks.—Says the *Engineer:* To the serious competition in permanent way fastenings coming from Belgium and France, has to be added the United States manufacturers of bright headed bolts and nuts, who are underselling Birmingham makers by from 20 to 25 per cent., and now a new danger threatens. We have competition in another class of hardwares coming from the most unexpected quarter. Politicians have spoken of some manifestations of the revival of energy throughout the Spanish nation, but it was hardly to be expected that from Barcelona there should be sent into the Birmingham district locks and hinges at prices with which Staffordshire makers are quite unable to compete. It would be a strange result of the finding of good hematite ore in Spain, and the using of it by the makers of best iron and steel in this country, if it should lead to this condition of things. At all events, it is found that the locksmiths of Barcelona are obtaining British iron through Birmingham merchants, are paying for it our prices, plus the importation duty in their own country, are manufacturing it into bright door locks of German patterns, and those locks, accompanied with cast iron keys, which they probably get from France, they are offering, together with beaten hinges, through the Birmingham merchants from whom they get the iron, at rates which are hardly more than the Staffordshire lock maker would have to pay for the materials from which his goods are mostly produced.

The National Tube Works Company was represented in the Bunker Hill Centennial procession by some fine specimens of lap-welded wrought iron tubing, drawn by six large black horses on a wagon tastefully draped with bunting. The tubing, some of the specimens of which were very large, was effectively arranged to represent a cannon on a gun carriage. The carriage was made of tubing, six sections on a side, the cannon being represented by a section of lap-welded tubing 12 inches in diameter, said to be the largest manufactured in the world. On each of the tubes of which the carriage is composed is the name of one of the original 13 States, and on the large tube representing the "big gun" was inscribed: "Massachusetts, 1775—Our Union Welded—1875."

The extensive rolling mill of Hoover & Sons, at Norristown, Pa., will resume operations this week, after having been idle nearly two years. The puddlers have agreed to work on the $4 basis to fill a contract order for 1000 tons of iron.

The Law of Trade-marks and their Analogues.

BY ROWLAND COX, ESQ.

VI.

Where the trade-mark consists of a word or words it may be infringed by a use of words which, although wholly different in appearance from the original, are *idem sonans*, and hence calculated to mislead. But cases of this kind are rare, the question in almost every instance depending upon the effect upon the eye.

A case of pronounced importance, which illustrates most happily the whole doctrine of infringement, was decided a few days since by Judge Drummond, of the United States bench, whose high character gives especial weight to his opinion. The marks involved were impressions upon soap, and the decision is, therefore, applicable in all instances where the marks are stamped upon the article itself, and not upon a label or tag. The two allocations were as follows:

PROCTER & GAMBLE.

MOTTLED GERMAN.

[Cut.]

S. W. McBRIDE & CO.,

GERMAN MOTTLED.

[Cut.]

The cuts were dissimilar, and the words "German" and "mottled" were admitted to be the common property of the public, so that the issue hinged upon whether there was such an imitation of the *tout ensemble* as would warrant the issuing of an injunction.

The case was heard in the first instance by Judge Blodgett, who ruled in favor of the defendants. He said, in substance, among other things, "there is scarcely a possibility of mistake. If parties desire the complainant's article they will specify Procter & Gamble's, and if they want the defendant's production they will ask for McBride's." But upon a subsequent argument before Judge Drummond it was decided that there was an infringement, and the defendants were restrained with costs. The litigation lasted nearly three years, the case having been held under advisement by the court for more than twelve months. The decision is one of great moment to every manufacturer, and is to be regarded as a very clear recognition of the most advanced views touching infringment, a pointed affirmance of the cases that are most favorable to the fullest protection of every class of marks.

As a general rule, therefore, the question of infringement is readily answered. Few experienced manufacturers will err in determining when the line which the law has fixed has been crossed. If they fail in an attempt to enforce their claim, it will be attributable to lack of care and discernment in bringing the case to trial, or because the mark is *malum in se*, or not the proper subject of ownership. The client, in short, will be right, and his counsel wrong, in his law or facts.

The views announced in connection with the topic that has been discussed in the present and two preceding papers might be abundantly fortified by the citation of numerous cases other than those that have been mentioned. They may be, as heretofore stated, advanced to the extreme limit of principle and precedent; but they are none the less, it is believed, sound, and, to all intents and purposes, the law of the land, being the law of the tribunals of final appeal. They are certainly the view of every jurist and text writer who has given the subject mature deliberation, and whatever doubts may exist concerning them can be traced to sources which are not to be regarded as strictly authoritative.

The true doctrine is that the law contemplates the simplest equity and nothing more—or, to put it in broad English, only fair play. Whatever is not fair play, if done *malo animo*, will be prevented by the courts if properly brought to their attention. And this is true not only of the question of infringement, but of every branch of the subject, provided always that there be nothing of a mechanical nature directly involved.

Where an infringement is found, the accepted doctrine is that damages follow *ex necessitate rei*. The rule is that the measure of damage is the amount of profits realized by the infringer in the sales of the article to which the simulated mark has been attached. The law proceeds upon the assumption that by means of the false marks the defendant has diverted to himself profits which, but for his wrong, would have accrued to the plaintiff. At any rate, the infringer is treated as a trespasser and compelled to respond accordingly.

There is, however, some obscurity in respect of the matter of damages, and the American cases are rare in which they have been insisted upon. But the doctrine above announced has never been directly disputed, and has been recognized in several instances, while in England it is definitively settled law. Practically, it is such in this country, the obscurity being attributable to other causes than those that have come of a difference between the views of jurists. It has usually happened that plaintiffs have ignored the minor question of compensation, and rested upon the establishment of their right to hold the mark at issue, and hence the subject of damages has been but infrequently passed upon.

The form of injunction should be such as to preclude the use of the mark complained of, and any and every other imitation of the original. This form is always allowed upon application, and when adopted places the defendant in a position where he is guilty of contempt if he attempts to evade the terms of the writ, and renders him liable to fine or imprisonment, in the discretion of the court, if the change is not a true departure.

In concluding the topic of infringement, it may be expedient, to prevent misapprehension, to revert to the point that the expression "possibility of deception" is not to be taken in a loose sense. There is a possibility of mistake where there is not the semblance of imitation in the marks. Two manufacturers may put up their goods in exactly the same form of package, and the difference in the names or symbols, however pronounced, may readily escape the observation of an incautious purchaser. Any possibility arising from such a cause is to be wholly excluded. *The inquiry has relation to the marks.* The question is, are A's *marks* an imitation of B's? Not, under any circumstances, are A's goods so packed that they will be mistaken for B's? If there be a possibility of mistake in respect of the marks, the words or signs which are applied as marks, in the narrow meaning of the term, the rule as laid down will obtain, after which the shape of the package and other like incidents become important as matters of circumstantial force. But the primal cause of deception must be found in the imitation of the *indicia* that the law recognizes as a species of property, and in it alone.

The speed of trains in Germany is illustrated by a report of the railroad bureau of the empire for the month of December last. It states that the greatest speed per hour, including stops at intermediate stations, was, for express and fast trains, 34 miles on the Berlin, Potsdam and Magdeburg road; for ordinary passenger trains, 25 miles per hour on the Maerchen and Posen road. The slowest speed were for express and fast trains 21 miles per hour on the East Prussia Southern Road; for ordinary passenger trains, 16 miles per hour on the Ermsthal and the Cromberg roads of Wurtemburg. The average speeds per hour were, for express and fast trains 28 miles; for ordinary passenger trains 21 miles. This is for the whole empire, except Bavaria.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, June 23, 1875.

During the past week there has been some uneasiness in financial and business circles owing to the recent heavy failures in London. Among them the metal trades have been pretty well represented, and fears have been entertained that a general panic would ensue, from the effects of which the trade of the whole world would suffer. The failures were not unexpected, however, and their effects have been so generally discounted that no serious fluctuations in general values resulted. In this country the financial markets are free from exciting causes.

The money market continues extremely easy, for the reasons noted last week, and call loans are made at 2 @ 2½ per cent.

The discount rate on good commercial paper is 3½ @ 5 per cent.

The gold market has been strong, and although no speculative combinations of consequence have been formed, the premium has kept well up, as will be seen from the following table, showing the extreme daily fluctuations:

	Highest.	Lowest.
Thursday	117⅛	117⅛
Friday	117⅛	117⅛
Saturday	117⅛	117⅛
Monday	117⅛	117⅛
Tuesday	117⅛	117⅛
Wednesday	117⅛	117⅛

The stock market was unsettled and feverish until Monday last, when a reaction set in, by which the Pacific Mail has most benefited. Tuesday afternoon the market declined again, and to-day it has experienced no important changes. The principal activity has been in Pacific Mail, Lake Shore, Western Union, Erie, Rock Island, Union Pacific and St. Paul. The highest and lowest of to-day's quotations of active stocks are given below.

The bond market has been strong, but dull both here and in London. Railway mortgages are strong, especially those of the Union and Central Pacific railroads. We give below the closing quotations of governments.

The following is a comparison of the bank averages for the past two weeks, showing a gain of $2,922,800 in total reserve and $2,697,950 in surplus reserve. The banks now hold $22,036,475 lawful money above the legal requirement:

	June 12.	June 19.	Differences.
Loans	$277,837,800	$275,217,500	Dec. $2,620,300
Specie	10,808,200	11,653,300	Inc. 845,100
Leg. tend	66,822,500	68,900,200	Inc. 2,077,700
Deposits	233,168,700	234,068,100	Inc. 899,400
Circulation	19,666,600	19,142,000	Dec. 524,600

The foreign trade movements for the week are shown as follows:

EXPORTS.

	1873.	1874.	1875.
Total for week	$5,790,952	$6,854,641	$4,683,961
Prev. reported	198,864,823	197,652,369	164,128,706
Since Jan. 1	$204,655,775	$204,507,010	$168,812,667

Among the imports of general merchandise were articles valued as follows:

	Quant.	Value.
Anvils	476	$5,200
Brass goods	9	1,398
Bronzes	15	2,262
Chains and anchors	28	1,006
Cutlery	60	15,601
Guns	45	9,099
Hardware	19	1,556
Iron, pig, tons	1,016	20,689
Iron, sheet, tons	22	1,492
Railroad bars	4,447	82,342
Iron, cotton ties	358	1,891
Iron tubes	660	1,372
Iron, other, tons	249	6,804
Iron ore, tons	430	661
Lead, pigs	2,741	12,579
Metal goods	88	13,210
Nails	1	221
Needles	13	6,012
Old metal		1,550
Per. caps	3	773
Saddlery	5	826
Steel	1,874	20,765
Spelter	66,275	3,655
Silverware	1	383
Tin, boxes	16,082	118,968
Wire	633	8,195
Zinc	5,500	375

EXPORTS, EXCLUSIVE OF SPECIE.

	1873.	1874.	1875.
For the week	$5,728,915	$6,429,678	$5,697,019
Prev. reported	128,913,005	131,359,355	110,836,324
Since Jan. 1	$134,640,920	$137,789,003	$116,533,343

EXPORTS OF SPECIE.

Total for the week	$6,236,979
Previously reported	42,566,803
Total since January 1, 1875	$48,803,782
Same time in 1874	26,656,102
Same time in 1873	24,927,410
Same time in 1872	32,683,580

Government bonds at the close were steady with quotations as follows:

	Bid.	Asked.
U. S. Currency 6's	122½	122⅞
U. S. 6s 1881, reg	130¾	131
U. S. 6s, 1881, cou	136¾	136½
U. S. 1862, 5-20 reg	118	—
U. S. 5-20 1862, cou	117⅞	118⅜
U. S. 5-20 1864, reg	118¾	119
U. S. 5-20 1864, cou	118⅞	119⅛
U. S. 5-20 1865, reg	121	121⅛
U. S. 5-20 1865, cou	122⅛	122⅜
U. S. 5-20 1865, reg. new	120⅜	120⅝
U. S. 5-20 1865, cou	123⅜	124⅛
U. S. 5-20 1867, reg	121⅛	121⅜
U. S. 5-20 1867, cou	125⅛	125⅜
U. S. 5-20 1868, reg	121⅜	121⅝
U. S. 5-20 1868, cou	124⅞	125
U. S. 10-40 reg	117⅞	118⅛
U. S. 10-40 cou	119⅛	119⅜
U. S. 5s, 1881, reg	117⅛	117⅜
U. S. 5s, 1881, cou	118¾	119

The following were the highest and lowest prices of stocks to-day:

	Bid.	Asked.
N. Y. Cen. & Hudson Consolidated	103	103¼
Lake Shore	62	60⅜
Delaware, Lackawanna & Western	119⅞	119¾
Cleveland & Pittsburgh	90⅜	90⅝
Wabash	7¾	7⅞
Western Union Telegraph	74	72½
Northwestern	38⅛	37⅞
" Pref	49¾	49⅞
Milwaukee & St. Paul	33	33¼
" " Pref	54½	54⅞
Pacific Mail	39¾	36⅞
Erie	13⅞	13⅝
Ohio & Mississippi	23⅞	23¾
Union Pacific	73⅝	73¾
Missouri Pacific	50	50
Atlantic & Pacific Preferred	15¼	15½
C., C. & Ind. Cen	4⅜	4
Hannibal and St. Joseph	23¾	23¾
Wells, Fargo & Co. Express	78½	78¾

GENERAL HARDWARE.

There is no improvement to notice in the demand for General Hardware, and few changes in quotations have occurred since our last review.

In Foreign Hardware there is little or nothing doing, and no changes in values to report.

The Na'l market continues in the same condition noted last week. We continue to quote 10d. at $3·25 per keg for lots of 200 kegs and over; for smaller lots $3·30 @ $3·40 is the asking rate, according to quantity.

On the 18th instant Burden's Horse and Mule Shoes were reduced 75 cents per keg. The following are the net prices of these goods in Troy, N. Y.:

Horse Shoes 4¾ cents per pound.
Mule " 5¼ " "

The quantity discounts from the invoice price of Burden's Horse and Mule Shoes are:

500 kegs dis. 2 per cent. } In current year, payable January, 1876.
1000 " " 3 "
1500 " " 4 "
2000 " " 5 "

The Rhode Island Horse Shoe Co. have issued the following circular:

OFFICE OF THE
RHODE ISLAND HORSE SHOE CO.,
PROVIDENCE, R. I., June 19, 1875.

Our present prices for Horse and Mule Shoes in New York are as follows:

	Per keg, cash.
Perkins Pattern	$4·87½
Rhode Island Pattern	5·87½
" " City	5·87½
Mule Shoes	5·87½
Perkins Trotting or Snow Shoes	6·62½

Horace Durrie & Co., 97 Chambers and 81 Reade streets, New York, are our only agents for the sale of our Horse and Mule Shoes, and they are authorized to sell, at all times, at our lowest factory prices. A full assortment of our Shoes we purpose to keep in their store, ready for immediate delivery.

RHODE ISLAND HORSE SHOE CO.

George W. Bruce, No. 1 Platt street, has issued a circular under date of 19th instant, in which he quotes Burden's Horse Shoes $4·87½, and Mule Shoes $5·87½ per keg. Union Horse Shoe Co.'s Mule Shoes, Nos. 1, 2 and 3, assorted, in keg $5·25 per keg, and No. 3 alone $4·50 per keg, net cash.

The following circular explains itself:

NEW YORK, June 15th, 1875.

GENTLEMEN: A recent agreement with the Auburn Tool Company gives us the exclusive sale of their Planes in this market, and consequently all orders for their goods, to receive prompt attention, should be submitted to us direct.

We purpose to keep a full line of their Planes, all kinds, in stock, which we guarantee to furnish at all times at lowest factory rates.

Yours, truly,
HORACE DURRIE & CO.

The Stamped Ware Manufacturerers Association of the United States held their annual meeting in this city on Tuesday, 22d instant. The attendance was large and the meeting harmonious. The only business of importance to the Hardware trade transacted was an advance in the price of Deep Stamped Ware to discount 20 per cent., formerly discount 25 per cent. In Common Stamped Ware no changes were made in either lists or discounts. The trade are aware that, although the market for Tin Plates of small sizes has for a long time been weak and in buyers' favor, still the advance in the gold premium has about equalized the net figures with those ruling six months ago, but the larger sizes of Tin Plates, and the extra qualities required for deep stamping, have been held all along at firm and unchanged figures. The advance in the gold premium has borne heavily on the manufacturers using these higher grades of Tin Plates, and hence the action taken at their meeting yesterday.

We invite the attention of the trade to the advertisement, on another page, of "The Buffalo Stove Boards," manufactured by Sidney Shepard & Co., Buffalo, N. Y. These goods have been before the public for several years, and are highly spoken of by dealers and consumers. They are offered to the trade at the following list, which is subject to discount 35 per cent., instead of 30 per cent., as formerly:

ROUND.

	Each.		Each.
24 inch Round	$1·35	32 inch Round	$2·25
26 "	1·50	34 "	2·50
28 "	1·75	36 "	3·00
30 "	2·00	40 "	4·00

SQUARE.

	Each.		Each.
22 inch Square	$1·40	30 inch Square	$2·25
24 "	1·50	32 "	2·50
26 "	1·75	34 "	3·00
28 "	2·00	36 "	3·50

OBLONG.

	Each.		Each.
24x28 inch Oblong	$1·75	32x40 inch Oblong	$3·00
26x30 "	2·00	32x44 "	3·50
28x32 "	2·25	34x45 "	3·75
30x36 "	2·50	34x48 "	4·00
30x42 "	2·75	36x42 "	4·00
32x36 "	2·75	36x48 "	4·50

The superiority of material and construction of these Stove Boards are now acknowledged by all. We advise customers to select by carefully measuring their Stoves. The Boards should be three inches, at least, longer than the compass of the Stove legs.

NOTE.—Full cases contain 24 Boards of each kind.

The Hazard Powder Co., No. 88 Wall street, in a card issued under date of 19th instant, say: "Should you desire a cheaper powder than our 'Enfield Rifle' (Deer) for 'Fourth of July,' we are prepared to supply you with our 'A' brand, fine grains, at $3·25 per keg."

We learn the Nicholson File Co.'s stock of Files has been much reduced, being now quite light, and that no reduction in prices is looked for at present. They say that their new net list of January 1, 1875, being an average some 15 per cent. discount from the $5 to £ list, has become quite popular, and is fast superceding that ancient and honorable document which history informs us took some six months' time of upward of 5000 Sheffield File makers (say nothing of the talent and intelligence of the Cutler's Association) to compile during the year 1872. The Hart, Bliven & Mead Manufacturing Co., 18 and 20 Cliff streets, New York, are the sole agents for these goods.

The Northampton Cutlery Co., No. 45 Murray street, have issued the following card under date of 10th instant.

Mr. Theodore Weed assumes the management of the business of this Company, at No. 45 Murray street, New York, Mr. D. P. Griffith having this day retired from the position.

In making the above announcement, we gratefully acknowledge the many favors and liberal patronage of our friends and dealers in Cutlery, etc., and respectfully solicit a continuance of the same. Very truly,
NORTHAMPTON CUTLERY CO.

Mr. Weed is long and favorably known to a large number of our readers; he purposes calling on his out of town friends during the coming season.

The Union Nut Co., 78 Beekman street, invite the attention of the trade to their Cast Steel Corn Hooks. The blades are polished and ground to a sharp cutting edge ready for use; the handles are of first class timber with square end, and are firmly strapped and riveted to the blade. They are packed in barrels of 7 dozen each. These goods are very clearly illustrated in their advertisement on page 33. They also illustrate in the same place Rules and Levels manufactured by the Standard Rule Co., for whom they are agents.

We invite the attention of capitalists to the advertisement of "Manufacturer," which will be found among "Special Notices" on opposite page. Although we are not at liberty to give any further information regarding this matter than is to be found in the advertisement, we are free to say that this is a *bona fide* offer, and in every way worthy the notice of capital seeking investment.

The subject of trade marks has occupied a good deal of our space from time to time. The following extract translated from the proceedings of the police court, Hamburg, on the 3d of May, 1875, in the matter of the prosecution of Carl Schulcke, for "criminal appropriations" is of interest to the trade:

"The Court doth adjudge that the accused, Alexander Bastian, partner in the firm of Carl Schulcke be condemned for a 'criminal appropriation,' under section 287 of the Penal Code, to a fine of 150 marks and to payment of the costs, and in default to ten days' imprisonment—(Signed) HOMANN Schrader. Certified. (Signed) HOMANN.—'L. S.,' seal of the Hamburg Court of Inquiry.

"REASONS.

"The accused confesses to have ordered, through the agent, Bleecher, from the house of Fr. Nief Sons, of Solingen, a quantity of knives stamped with an imitation of the firm and mark of Joseph Rodgers & Sons, of Sheffield, and after importation here, shipped them to China for retail sale there. It is thereby established that the accused has knowingly trafficked in knives falsely marked with the names of a Sheffield manufacturer, an offense punishable according to section 287 of the Penal Code, since mutuality is secured by the English Law of the 7th August, 1872 (an Act to Amend the Law relating to the Fraudulent Marking of Merchandise).—Since already a fine of 50 thalers has been adjudged against Nief Sons, an equal fine necessarily seems proper as against the accused.

"CAUTION.

"In August, 1874, a case of Cutlery was seized at the Custom House, London, on its way from Hamburgh to Shanghai, bearing the marks:

"RODGERS, Cutlers to Her Majesty."
"No. 6 Norfolk street."

Messrs. Joseph Rodgers & Sons, Limited, having ascertained that the goods had been ordered by Carl Schulcke & Co., of Hamburg, from the firm of Fr. Nief & Sons, of Solingen, and sent to an agent in London for trans-shipment per the Hong Kong to Shanghai, proceeded against those parties for illegal appropriation under Article 287 of the German Penal Code. On the 2d December, 1874, at the Tribunal of Correctional Police, at Elberfeld, Ernst Nief, the partner in the firm of Fr. Nief & Sons, was condemned and sentenced to pay a fine of 50 thalers and costs, or 10 days' imprisonment. And on the 3d May, 1865, at the Police Court, Hamburg, Alexander Bastian, partner in the firm of Carl Schulcke, was condemned, under Section 287 of the Penal Code, to a fine of 150 marks and payment of costs, or in default, 10 days' imprisonment.

The Sheffield *Telegraph* of the 27th ultimo contains the following remarks on this case:

Whatever faults may be found with the Germans, it is impossible not to give them credit for an admirable thoroughness. When they pass laws they mean that those laws shall be carried out. Some other countries favor legal enactments which only cumber the statute books and tend to demoralize the people who habitually break them. The American liquor laws are a farce; the law against the smoke nuisance is in Sheffield and other large towns of England an utter and disgraceful failure. There are districts in England where the recent education act still remains a dead letter. The Germans do not believe in this sort of thing. Their system is inexorable, their logic remorseless. When they lay down rules they mean that those rules shall be obeyed—and woe to the man who breaks them. Germany recently took up the trade marks question. The authorities determined that the appropriation by one maker of the name and good fame of another should be regarded as a criminal transaction. They decided that it was not right that John Schmidt should palm off upon his customers at Dusseldorf or elsewhere, as Sheffield goods, knives and other articles of his own manufacture. They declared that the piracy of trade marks should be regarded as a grevious offence, as a means of robbing the purchaser of his money and the honest manufacturer of his good name. Having come to this decision, they carry it out. They do not hesitate to carry their logic to its consequences. They are not like certain English judges who have denounced in the strongest terms the immorality and injustice of one man stealing another man's trade-mark, but have decided five minutes after that if the man had gone on for some time with such, a theft, it was not in the province of the law to stop him or punish him. It is not very long since the new law come into operation in Germany, but already we find that it is being put in force vigorously at Elberfeld, Hamburg and elsewhere. An extract translated from the proceedings of the Hamburg Police Court, shows that swift justice is being meted out to the pirates who, by making and selling base imitations of Sheffield goods, do their best to ruin the trade and spoil the good name of the Capital of Cutlery. It appears that a certain partner in the house of Carl Schulcke ordered from a German house a quantity of knives stamped with an imitation of the style and trade-mark of Joseph Rodgers & Sons, Limited, of Sheffield. This being brought home to the accused, a fine was inflicted—with the alternative of imprisonment—and a caution was given to other offenders. There are a good many Sheffield manufacturers who wish that the action of our English law courts in trade-mark cases were as prompt and unflinching as that of the German tribunals.

The following circular explains itself:

FLORENCE, Mass., May 28, 1875.

DEAR SIR: Our attention has been called to a circular issued by Mr. Geo. B. Turrell, president of the Union Hardware Company, dated April 17, 1875, in which he says that by virtue of an assignment of the patent granted to John Lovatt, for improvement in Skates, dated May 29, 1860, and reissued April 6, 1875, No. 6369, he claims: "The exclusive right to manufacture and sell all Skates in the United States that fasten to the boot or shoe by means of clamps grasping the sole; also, all that grasp both the heel and sole of the boot or shoe, when the clamps are moved and held by suitable mechanism." He also warns all manufacturers and dealers in Skates that infringers upon these rights will be held amenable to the law for damages.

To this broad claim of Mr. Turrell we beg leave to offset the following extract from the application for this same reissue of the John Lovatt patent, No. 6369, viz.:

"Before this invention a Skate had been made with clamps to hold the Skate to the sole and heel of the boot or shoe, and such clamps were movable, to accommodate varying sizes of boots and shoes, and retained in position by bolts and nuts that held the clamps to the sole or heel plates."

The Florence Clamp Skates involve several inventions of Gen. Oliver Edwards, which are secured by Letters Patent. They do not infringe the patented inventions of any one else. The use of clamps as parts of a Skate by which to fasten it to the sole and heel of the boot or shoe is older than any existing patent, and no one can rightfully claim that he is entitled to an exclusive use of clamps for this purpose, as his private property.

Patents for combinations cover only the combination of parts shown in the specifications, and are not infringed by the use of some of the parts named, in combination with parts more recently invented. No re-issue of an old patent can stretch it so as to cover devices invented after the patent was first applied for. No Skate infringes the re-issue of John Lovatt's patent of May 29th, 1860, re-issued April 6th, 1875, No. 6369, which does not contain his particular mechanism for fastening the clamps, any pretense set up by the holders of that patent to the contrary notwithstanding.

All dealers in the Florence Skates are hereby notified that this Company will protect its rights as against the assumptions and claims of any rival manufacturers.

We shall be prepared with our descriptive Skate list for the next season about the first of July, when we shall wait upon you again.

Our new Clamp Skates are the only Skates made that fasten securely to the boot or shoe, and at the same time hold the feet firmly within the boot or shoe.

Respectfully yours,
FLORENCE SEWING MACHINE CO.
WILLIAM B. HALE, President.

BRITISH IRON MARKET.

(Specially reported by cable for The Iron Age.

WEDNESDAY, June 23, 1875.

Scotch Pig.—Prices have fluctuated in both directions since last report, but the market is now drooping, and there is but little business doing. The following are makers' quotations:

Gartsherrie No. 1	66/
Coltness No. 1	67/6
Glengarnock No. 1	68/6
Eglinton No. 1	61/

No change to note in **Manufactured Iron** or **Rails.**

IRON.

American Pig.—About half the furnaces in the Lehigh region are now in blast, and the demand is not sufficient to absorb their product, which is accumulating. While some of the old and strong companies are able to adhere firmly to $28 and $26 for Nos. 1 and 2 Foundry, good Iron can be bought from second hands and from other companies at a material concession. The business done is in a small way, and we hear of no sales of moment. We quote No. 1 Foundry, $27 @ $28; No. 2 Foundry, $25 @ $26; Gray Forge, $23 @ $25.

Scotch Pig.—The smallness of the stock here and an advance in freights have given a firmer tone to the market, though without any improvement in quotations. We quote Coltness, $31 @ $32; Glengarnock, $32 @ $33; Gartsherrie, $31 @ $33; Eglinton, $29 @ $30. Three hundred tons of Coltness have been sold at $30.

Rails.—We continue our quotations of $48 @ $50 for American at mill.

Old Rails.—We note the sale of 500 tons at $26·50, which we quote as the market price.

Scrap.—An importation of about 100 tons of Scrap Iron has just been received from London, which is the first since October, 1873. It is not likely, however, that the result of this venture will encourage others. We note the sale of 170 tons mixed Wrought and Cast—also, 450 tons Wrought, all on private terms. We quote, $30 @ $32.

METALS.

Copper.—Sales for the week have amounted to but 200,000 pounds Lake, on the spot, at 23c. Nothing has transpired in futures. A sale was rumored at 22¾c., but we cannot trace it. Some parties are endeavoring to bear Copper, but without success, the offerings being too insignificant. Consumers are bare of supplies. Our market closes quiet, but firm, the want of activity being mainly due to the nearness of the national holidays. We quote Lake 23c., spot, and 23½c., futures; Baltimore is firm at 23c. From London, the last official telegram received was dated Saturday, when Best Selected stood £90, and Chili Bars £82 @ £82. 10/. The large London failures have not depressed the metal markets of Europe to any appreciable degree, nor have they had much effect here in any one branch of finance or trade that we know of, notwithstanding the magnitude of the liabilities. Great Britain's business relations are so vast, the dealings of some firms so widespread, that an aggregate of between £30,000,000 and £50,000,000 failures in a single month seems to make no very deep impression while money is easy. It would have been very different had money been tight; indeed, one-third of the above failures would have precipitated a Black Friday and its consequences. And as for ourselves, we have sobered down so mightily since September, 1873, that nothing will excite us at present, be it good or bad. The manufactures of Copper display no particular feature, and remain steady as follows: New Sheathing, 30c.; Bolts and Braziers, 31c.; Bronze and Yellow Metal Sheathing, 21c.; and Yellow Metal Bolts, 28c.

Tin—Continues steady in Europe at late cable quotations, while at Singapore it has recovered to $22·25. The whole tone pervading both the European and American markets is one of greater firmness, altogether due to the good deliveries on the other side, which have in a great measure exceeded the expectations of the metal trade. Early in January people had their grave doubts on this subject, but as the year advanced a vigor developed in this item of the takings for actual use, which has created quite a sensation, considering the dullness of the times and the extreme caution with which consumers evidently went to work. If during the latter half of the year the producing countries will but resort to sailing vessels instead of to steam and the Isthmus, the available supply in Europe would be reduced once more to a managable figure, and the deliveries would be gaining upon it, we have no doubt, fast enough to produce a revulsion of a lasting nature, allowing the afloats to arrive to a good market and to leave profits, a thing that has not been seen for a long time past. The effect of such a wiser course would soon be felt in our own market, where both operators and consumers would take courage, and forget past disappointments. An interesting article about the Queensland Tin field has been received by us from Australia, from the pen of Mr. Hume, commissioner of mineral lands of the colony, according to which Tin may be eventually raised there at a profit at 3½d. per lb.; it would not pay now under 4d. He strongly advocates smelting at the mines, instead of at the outports. The cheapness of production will, of course, stimulate the latter, but Tin values in general will continue to be regulated by the supply and the demand. Trade in Tin has remained sluggish in our own market; a sale of Banca was reported, said to have been done at 23⅝c., gold, which would be a full figure, and none in other kinds. A reshipment of English has been advised of some 40 tons. We quote Straits, 18¾c., gold; English is nominal, none being offered, and Banca we quote 23⅝c., gold. These are quotations for large lots. Tin for consumption commands between 19c. and 19¼c., gold. Tin Plates in large parcels have been inactive, while in a jobbing way business, though moderate, yet remains sufficiently brisk to show that real wants are, if anything, on the increase. We quote for large parcels, gold, per box, as follows: Charcoal Bright, $8·25 @ $8·37½; do. Ternes, $7·50 @ $7·62½; Coke Tin, $6·87½ @ $7; and do. Ternes, $6·75, all ordinary brands.

Lead.—About 3500 tons have been sold to consumers for present and future deliveries, including all the Selby here and to come for 90 days, about 700 tons Western, and several hundred tons of Newark Lead. The remaining stock is now very light, only about 1500 tons outside of what the government holds, which is about 2000 tons. The sales above alluded to were all on the basis of about 5¾c., gold, and prices to-day are 6⅛c. @ 6¼c., gold, and the Western holders are firm at about 7⅛c., currency, laid down here. People in Europe, on the other hand, get frightened at the Peninsular output. Spain's mineral resources are vast, varied and inexhaustible, and being to the extent of three quarters in the hands of rich, capable and enterprising Englishmen, the next statistical exhibit to be issued at Madrid will probably show that the country, in spite of civil war, is fully restored to the most ample productive capacity. Foreign Lead in our own market, ordinary brands, are nominally still 6¾c. @ 6⅞c., gold, to-day. In this item a change may now occur, considering the large transactions in Domestic we have noted. Manufactures of Lead are steady as follows: Bar, 8¾c.; Pipe, 9¼c.; and Sheet, 9¼c., less 10 per cent. to the trade.

Spelter and Zinc.—Very little transpires in Spelter. Of Foreign there is none here, and none afloat. We quote Silesian 7¼c. @ 7⅝c., gold. Domestic has been moving off slowly from jobbers' hands at 7½c., currency, while the combination price for larger lots is 7·15c., currency, cash, and 7¼c., currency, 30 days, at which figures the metal sells in but moderate quantities. The combination people will meet at Chicago toward the close of the month, when a modification of rates in either direction may be resolved upon in time to meet the greater briskness that will be dawning upon the Brass trade in all likelihood in August. Sheet Zinc is as quiet as ever at 8½c. @ 8⅝c., gold.

Antimony.—The metal is firm, but unexcited at 13c. @ 13¼c., gold, for large lots. To import it from England it costs 14¼c. @ 14½c., gold.

COAL.

The long continued strike is now virtually at an end, and a better feeling is apparent among dealers. Circular prices will again be issued, according to the Associated Coal Companies' programme, by the companies whose collieries have been idle during the strike, and, in a short time, business will be in active operation as heretofore. Cumberland Coals are in good request, at steady prices.

The quantity of Coal sent from the Schuylkill region the last week was 30,342 tons by rail; by canal, 2019 tons; for the week, 32,261 tons, against 99,624 for the corresponding week last year.

The supply sent from all the regions for the week is 338,770 tons Anthracite, and 86,508 tons Bituminous; for the week, 425,338 tons, against 506,980 tons for the corresponding week last year. Decrease, 81,642 tons.

The supply sent from all the regions so far

this year foots up 6,853,023 tons, against 9,189,257 tons to same period last year. Decrease, 2,336,234 tons. The decrease in Anthracite is 2,394,808 tons.

We quote as follows: Anthracite, $4·75 @ $5·70; Cumberland, $6·50 @ $7; West Virginia, $6·75 @ $7; James River Steam, $6·25; James River Carbonite, $9 @ $9·50; Kanawha House, $14·25; American Gas, $7 @ $8·00; American Cannel, $12 @ $14; Pennsylvania and Westmoreland, $6·75; Murphy Run, $6·50; Newburg Orrel, $6·50; Sterling Ohio, $10; Ince Hall, $17 @ $18; Liverpool House Cannel, $17; Liverpool Gas, $12; Newcastle Gas, $7; Scotch, $7·50 @ $8.

The Coal transported over the Cumberland Branch Railroad during the week ending June 19, 1875, amounted to 6701 tons, as against 7476 tons shipped in the corresponding period of last year, showing a decrease of 775 tons. Over the Cumberland and Pennsylvania Railroad, for the same period, the shipments were 50,254 tons, against 52,629 tons shipped in 1874, a decrease of 2375 tons. The aggregate amount of Cumberland Coal shipped by the various companies so far this year amounts to 950,811 tons.

OLD METALS, PAPER STOCK, &c.

We have very little change to note in the condition of this market since our last report. Business continues quiet, and prices remain about the same as last quoted. The Old Metal market is still laboring under a season of dullness, and no transactions worthy of note have occurred since our last report. Rags and Paper Stock continue unchanged. We quote the following as the current purchasing rates:

Old Metals.—Copper, 16c. @ 17c. per lb.; Yellow Metal, 11c.; Brass, 10c. @ 12c.; Composition, heavy, 13c. @ 14c.; Lead, solid, 5½c.: Tea Lead, 4½c.; Zinc, 4¼c. @ 4½c.; Pewter, No, 1, 18c.; do., No. 2, 8c. @ 12c.: Spelter, 5c. @ 5½c., Wrought Iron, 1¼c.; Sheet do., ½c.; Cast do., ⅓c.; Machinery, do., ⅝c.

Rags, &c.—Canvas, Linen, 5c. @ 5½c.; do. Cotton, No 1, 6c. @ 6½c.; No. 2, 2½c.; White, No. 1, 6½c.; No. 2, 4½c.; Colored, do., 2c. @ 2½c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 5c. @ 5½c.; Gunny Bagging, 1¼c.; Jute Butts, 1¾c. @ 2c.; Kentucky Bagging, 3c.; Book Stock, 3c.; Waste Paper and Scraps, 1½c.; Kentucky Bale Rope, 4c.; Oakum Junk, No. 1, 4¼ @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c. @ 1½c.; Grass Rope, 2½c. @ 2¾c.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending June 22, 1875:

Hardware.

Armstrong M. & Son, Casks, 1
Boker Hermann & Co. Mdse. pkgs., 4 Gun wads, cs., 15 Packages, 17
Bergmann Thos. Tools, cs., 1
Drexel, Morgan & Co. Nails, bbls., 5
Folsom Chas. Cartridge cs. empty, cs., 5
Field A. & Co. Cases, 11 Bundles, 3 Spades, bdls., 12 Chains, cks., 33
Fuller Bros. Hooks, cks., 1
Grubb J. C. K. Per. caps, cs., 1
Hutchinson J. W. Cases, 2 Guns, cs., 6
Keuffell & Esser, Cases, 1
Lau & Garliche, Gun wads, cs., 5 Per. caps, cs., 7
Laughland & Co. Wire, cks., 5 Netting, cs., 6
McKinless J. W. & Co. Wire rope, coils, 2
Peters Bros. Cutlery, cs., 3
Pierce de S. Austin, Per. caps, cs., 7
Rosenfeld Bros. Packages, 5
Russell & Erwin Mfg. Co. Files, cks., 4
Schoverling & Daly, Mdse. pkgs., 1 Cartridge cs. empty, cs., 19
Trost H. & Co. Cases, 1
Turnor R. A. Cutlery, cks., 2 Cases, 1
Taylor Thos. Cutlery, cs., 1
Tillotson L. G. & Co. Galv. wire, lots, 596
Van Wart & McCoy, Cases, 2
Ward A. Cutlery, cs., 3
Order. Cases, 5 Packages, 9 Files, cks., 14 Hammers, cks., 1

Iron.

Champion H. Boxes, 72
Darrell & Co. Scrap, tons, 3
Irwin R. & Co. Pig tons, 300
Lennox E. S. Bale ties, lots, 509 Boxes, 1
Laughland & Co Hay bands, bdls., 305
Naylor & Co. Rails, 574
Page E. & Co. Bars, 5901
Phelps, Dodge & Co. Sheet, bdls., 386
Reitlinger A. H. & Co. Packages, 4 Lots, 2
Order. Tons, 740 Bars, 5936 Scrap, tons, 180; cs., 10; bbls. 68; lbs. 395,674

Steel.

Brown Wm. Bundles, 104 Cases, 11
Hogan John, Bundles, 15 Cases, 9 Casks, 5
Jacobs, Strouse & Co. Strips, cks., 4
Naylor & Co. Tires, cast, 4 Packages, 42 Scrap, spring, tons, 12
Prosser Thos. & Sons, Tire forgings, 52 Bars, 19
Robbins C. & Son, Bundles, 190 Coils, 50
Taylor Thos. Wire, cs., 2
Woodford W. O. Cases, 13 Bundles, 65
Order. Rails, 2006 Bundles, 595 Cases, 2

Metals.

Byrne Joseph & Co. Tin plates, bxs., 510
Brown Bros. & Co. Tin, slabs, 1270
Bruce & Cook, Tin plates, bxs., 7465
Bear J. & Son, Boxes, 11
Cort N. L. & Co. Tin plates, bxs., 231
Canadian Bank of Commerce, Tin plates, bxs., 1171
Figuera, Lead, pigs, 2100
Grinnell, Minturn & Co. Sheathing, cs., 59
Lamarche H. Zinc, cks., 86
Noel, Saurel & Harneffe, Tin, sheets, cs., 10
Phelps, Dodge & Co. Tin plates, bxs., 3726 Black taggers, bxs., 130
Tucker J. S. Scrap, pkgs., 6
Windmuller L. & Roelker Zinc, cks., 2
Order. Tin plates, bxs., 2345 Zinc, plates, 10,318 Tin, slabs, 2612 Lead, pigs, 1640

PHILADELPHIA.

PHILADELPHIA, June 22, 1875.

The resumption of work in the coal regions has produced a somewhat firmer feeling in the Iron market, without, however, materially affecting either prices or transactions. Furnace owners whose stacks are out of blast contend that either an advance in price of Pig Metal, or lower prices for Coal, must be had before they can afford to increase production. Those who are in blast contend that prices are too low to admit of any margin, while mill owners and consumers of Manufactured Irons persist that, at rates current for their product, prices of Pig Metal are too high. Such is the situation of the market, and with the usual July stoppage of mills near at hand, there is no reason to expect any material improvement in trade within the next 30 days. The very general impression prevails in all industries that with wages materially reduced in the coal regions, with lower prices for all other commodities, and with the actual condition of trade, that it is not unreasonable to expect a reduction of the price of Coal to a level with that of other articles of consumption. The only thing which can have a tendency to at all advance the price of Pig Metal is the statement, presumed to be reliable, that the stocks of Pig Metal in the Shenango and Mahoning valleys are so considerably reduced as not to exceed three weeks' supply for the mills of Pittsburgh, all of which are busy, although at very low prices. Against this are reported considerable stocks in the East, as at yard in Reading, at some New Jersey furnaces, and elsewhere. Certain it is that no difficulty is found in shading quoted rates, and most of the transactions reported as on private terms are materially lower than quotations. In Manufactured Irons, Bars are very dull, but will probably be maintained in price by the curtailment of product due to the July holiday and repairs stoppage, which generally consumes the greater part of the month. Rails are in better request, but the transactions, if any, are kept quiet. The increased activity in Rails West is, however, being reflected on Eastern mills, and in a few weeks may produce trade. Old Rails continue quiet, and Scrap as at our last.

PIG IRON.—Prices remain at $27 to $28 for No. 1 Foundry; $26 for No. 2; $23 to $25 for Gray Forge.

BARS.—2·6c. to 2·8c. per lb.

RAILS.—$48 to $50 at works.

OLD RAILS.—$26 to $27.

SCRAP.—$31 to $32 for No. 1 wrought.

Among the sales are 1000 tons No. 1 Foundry at $27; 500 tons Gray Forge at $24·50, and several private lots; 2000 tons No. 1 extra Lehigh iron, equal to $27·50 here; 1000 tons No. 2, ditto, equal to $25·50 here; 2000 tons Gray Forge Pipe Irons at $23, delivered; 500 tons Gray Forge, $23·50; an order for 3000 tons Rails; 3500 tons ditto 56's and 45's, at $49, cash, at mill; 1000 tons Old Rails, equal to $26·50 New York; 2000 ditto, Western, $29; 500 tons Muck Bar on private terms; some large lots of Pipe Irons, and a specification closed or closing for 7500 tons Pipes for account of a Canadian city.

PITTSBURGH.

The Pittsburgh *Commercial* of June 19th says: The course of the Pig Iron market during the past week presents no unusual features, as values have remained steady at about the prices reported in our last. Two sales of extra Gray Forge, aggregating 600 tons, have been reported at $25, four months, but the selling price for No. 1 is unchanged at $24. Transactions are wholly based on the demand for immediate use. Mill owners would probably be willing to purchase for future delivery at present prices, but furnace owners claim, with some force, that present prices are too low for them to make such contracts; while, on the other hand, the price of Manufactured Iron does not allow manufacturers to pay an advance on future contracts for metal. The demand for Pig metal will probably remain steady for some time; but no appreciation in values is probable until a similar improvement takes place in the market for Finished Irons. Muck Bar, Blooms and Scrap Iron have been less prominent features in the Iron market since the termination of the puddlers' strike. Still there is a steady demand, which rapidly absorbs a considerable portion of the receipts. Many of the mills continue to run on this class of supplies, alleging that it is cheaper than to puddle their own iron. We note sales of Muck at $42·50; No. 1 Juniata Blooms at $75; Scrap continues quotable at $38 @ $39 for ordinary Wrought. The sales of the week have been liberal, aggregating 3060 tons. They are as follows.

BITUMINOUS COAL SMELTED FROM U. S. ORE.

700 tons gray forge	$24·00—4 mos.
400 tons gray forge extra	25·00—4 mos.
250 tons gray forge	24·00—4 mos.
250 tons gray forge	24·00—4 mos.
200 tons gray forge extra	25·00—4 mos.
200 tons gray forge	24·00—4 mos.
200 tons gray forge	24·00—4 mos.
200 tons gray forge	24·00—4 mos.
100 tons gray forge	24·00—4 mos.
100 tons gray forge	24·00—4 mos.

CHARCOAL.

100 tons Tennessee, C. B.	$32·50—cash,
100 tons No. 1 foundry, H. R.	$30·00—4 mos.
40 tons No. 1 foundry, H. R.	$30 @ 32—4 mos.
20 tons No. 1 foundry, H. R.	$30·00—cash.

ALLEGHENY COKE.

50 tons Red B ink	$25·00—4 mos.

CONNELLSVILLE COKE.

10 tons No. 1 foundry	36·50—4 mos.

ANTHRACITE.

20 tons No. 1 foundry	$28·00—4 mos.

BLOOMS.

20 tons No. 1 Juniata	$75·00—cash.

MUCK BAR.

20 tons neutral	42·50—4 mos.

BOSTON.

JUNE 19.—*Pig* has had a very quiet week, neither buyers nor sellers canvassing this market. One or two New York lots have been landed on wharf and at depot here for prominent foundries, of good brand, No. 1 X American at $28 50, 30 days. The market for foreign is considerably unsettled by the reports and offers from New York, and holders there are quite at sea where to name a price which would tempt sales. The cable advices from Glasgow report that point as rather weak, which further adds to the distrust here expressed. This market quotes nominally $2 a ton above New York, at which point the nominal range is Eglinton, $29 to $30; Coltness, $31; Glengarnock and Gartsherrie, $31 to $33. The market here for American quotes on wharf No. 1, $29 to $31; No. 2, $22 to $27, and gray forge, $21 to $24. New York advices quote Hoboken $27 to $29, No. 1; $24 to $28, No. 2; and $22 to $26, gray forge. *Bar* jobs along in a trivial way at $60 to $65, with buyers occasionally able to pick up lots at $58. There is a little better tone visible than was current a week ago. The publicity of the demoralization toward which some were drifting the market, tended as a check. The receipts for the past two weeks have been quite small, and stock are rather light with sizes and assortments somewhat broken. Common iron is very listless at $54 to $56. *Steel* is having a slightly improved inquiry for machinery and small tool, with prices steadily maintained. We quote American Tool, 15c. to 15½c.; American Machinery, 9½c. to 10c.; do. Cash Tires, 8½c. to 12½c.; Sweet's Excelsior Tire, 7c. to 7½c.; English Tool, 16c. to 17c. *Copper*, although very dull, is firmer through the slight speculative inquiry which began to develop toward the close of the week. We quote 22¾c. to 23c. for spot; New Sheathing, 30c.; Bolts and Braziers, 31c.; Yellow Metal Bolts, 28c. to 29c. *Lead* is quiet and steady. We quote Domestic, 6c.; Foreign, 6¾c.; Antimony is in better demand from New York and is fully ¼c. higher. We quote at 12¼c. to 12½c., gold, per pound; Sheet and Pipe, 9½., currency; Tin-Lined Pipe, 16¼c.; Bar Lead, 9½c., less usual trade or 10 per cent. discount. *Spelter* is having a small steady business with prices well maintained by the combination. We quote $7 25, currency, 30 days, or $7·15, currency, prompt cash. Silesian is quiet, quoting nominally $7·30, gold. *Tin* is easy, business being exceedingly slack. Plates are quiet. We quote Straits, 20c.; Banca, 24½c.; Refined English, 19¾c., gold. Plates are active. We quote: Charcoal I. C., $9·50 to $10; Coke, $7·75 to $8; and Terne at $8·50 to $11, gold.—*Com. Bulletin.*

LOUISVILLE.

Messrs. GEO. H. HULL & CO., under date of June 21, writes us as follows: There is more demand for both cold and hot blast, but at reduced figures. We revise quotations as below, in accordance with recent sales. The usual time, 4 mos., is allowed on the following quotations:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores	$27·00 @ 28·00
" 2 " " " "	25·00 @ 26·00
" 1 Mill, " " "	23·00 @ 24·00
" 1 F'dry, from Alabama, Georgia and Tennessee Ores	25·00 @ 26·00
" 2 F'dry, from Alabama, Georgia and Tennessee Ores	24·00 @ 25·00
" 1 Mill, from Alabama, Georgia and Tennessee Ores	23·00 @ 24·00

HOT BLAST STONE COAL AND COKE.

No. 1 F'dry, from Hanging Rock Ores	$25·00 @ 26·00
" 2 " " " "	24·00 @ 25·00
" 1 Mill, " " "	23·00 @ 24·00
" 1 F'dry, from Alabama, Georgia and Tennessee Ores	25·00 @ 26·00
" 2 F'dry, from Alabama, Georgia and Tennessee Ores	24·00 @ 25·00
" 1 Mill, from Alabama, Georgia and Tennessee Ores	23·00 @ 24·00
No. 1 F'dry, from Missouri Ores	27·00 @ 28·00
" 2 " " "	26·00 @ 27·00
" 1 Mill, " "	26·00 @ 27·00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores	35·00 @ 40·00
" " Tennessee Ores	30·00 @ 33·00
" " Alabama and Georgia Ores	30·00 @ 35·00
Car Wheel from Kentucky Ores	28·00 @ 35·00

CINCINNATI.

Messrs. L. R. HULL & CO., under date of June 21, write us as follows: PIG IRON.—We are able to report an improvement in demand, which will probably be well sustained for some weeks at least. The more favorable reports from Eastern points must also have a corresponding effect on this market, and we hope that prices have touched their lowest point for the year. We quote:

HOT BLAST CHARCOAL.

Hanging Rock	No. 1	₩ ton. $28·00 @ 29·00—4 mos.
" "	No. 2	26·00 @ 27·00—4 mos.
" "	Forge	25·00 @ —4 mos.
Virginia	No. 1	27·00 @ —4 mos.
"	No. 2	25·00 @ —4 mos.
"	Forge	24·00 @ 25·00—4 mos.
Tennessee	No. 1	27·00 @ —4 mos.
"	Forge	24·00 @ 25·00—4 mos.
Alabama	No. 1	26·00 @ —4 mos.
Missouri	No. 1	28·00 @ 29·00—4 mos.
"	No. 2	26·00 @ 27·00—4 mos.

HOT BLAST STONE COAL.

Missouri	No. 1	₩ ton. $28·00 @ —4 mos.
"	Forge	26·00 @ —4 mos.
Ohio	No. 1	25·00 @ 28·00—4 mos.
"	Forge	24·00 @ 26·00—4 mos.
Am. Scotch,	No. 1	25·00 @ 26·00—4 mos.

COLD BLAST CHARCOAL.

Hanging Rock	Car Wheel	₩ tn. $35·00 @ 40·00—4 mos.
Missouri	" "	35·00 @ 40·00—4 mos.
Kentucky	" "	35·00 @ 40·00—4 mos.
Tennessee	" "	30·00 @ 40·00—4 mos.
Georgia	" "	30·00 @ 40·00—4 mos.
Alabama	" "	32·00 @ 40·00—4 mos.
Machinery and Forge		30·00 @ 35·00—4 mos
Blooms		70·00 @ 90·00 —4 mos.

ST. LOUIS.

Messrs. SPOONER & COLLINS, Iron commission agents, 409 North Third street, St. Louis, under date of June 18, report the Iron market as follows: Our market still continues dull with no better prospects until after July. Trade in Foundry Irons very light. Mill Irons are in limited demand to fill present wants. We quote as follows, on 4 months time:

Mo. Stone Coal,	No. 1 F'dry.	$28·00 @ 29·00—4 mos.
" "	No. 2 F'dry.	26·00 @ 27·00—4 mos.
" "	No. 1 Mill	25·00 @ 26·00—4 mos.
" Charcoal,	No. 1 F'dry	28·00 @ 29·00—4 mos.
" "	No. 2 F'dry	26·00 @ 27·00—4 mos.
" "	No. 1 Mill	25·00 @ 26·00—4 mos.
Tenn. Charcoal	No. 1 F'dry	28·00 @ 29·00—4 mos.
" "	No. 2 F'dry	26·00 @ 27·00—4 mos.
H. R. "	No. 1 F'dry	29·00 @ —4 mos.
H. R. "	No. 2 F'dry	27·00 @ —4 mos.
H. R. "	No. 3 F'dry	26·00 @ —4 mos.
Massillon,	No. 1 Foundry	36·00 @ 37·00—4 mos.
"	B, No. 1 Foundry	34·00 @ 36·00—4 mos.
"	No. 2 Foundry	33·00 @ 34·00—4 mos.
Cold Blast Car Wheel	Mo.	37·00 @ 40·00—4 mos.
" "	Tenn. Hanging Rock	35·00 @ 40·00—4 mos.
		53·00 @ 55·00—4 mos.
Mo. Charcoal Blooms		75·00 @ 85·00—4 mos.
No. 1 Wrought Scrap		1¼c. per lb.
Machinery Cast "		1c. "
Stove Plates		⅞c. "

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, South Charles and Lombard streets, report us the following prices under date of June 22: We continue to report a quiet and dull market. There is some little inquiry for Rails and Bars, to satisfy immediate and pressing wants, and both are being handled at very close figures. We quote the market depressed, with list nominally unchanged.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ¾ to 1 thick	2·6-10 to 2 7-10c. ₩ lb.
1 to 4¾ wide by 1¼ to 2 thick	
Round and square, ordinary sizes, from ¾ to 2 inclusive	2 6-10 to 2 7-10c. "
Hoop Iron, 1½ wide and upward	4¼c. to 4½c. "
Band Iron, from 1¾ to 4 in. wide	3¾c. to 3¾c. "
Horse Shoe Iron ¾ to 1 wide by ⅜ to ½ thick	4 to 4¼c. "
Norway Nail Rods	6¾c. to 7c. "
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	15¾c. to 16c. "
Machinery Steel	11 to 11¾c. "
Cast Spring Steel	10 to 10¾c. "
Homogeneous Steel Plate	10¾c. "
Perkins' Horse Shoes, per keg of 100 lbs.	$5·62½
" Mule Shoes " "	6·62½

Common Horse Nails, from 14c. to 18c. per pound.

	10	9	8	7	6	
Putnam Horse Nails	23	24	25	26	28c.	per lb.
	10	9	8	7	6	
Globe Horse Nails	23	24	25	26	28c.	per lb.
R. R. Spikes	5¾ by 9-16 at 3c to 3¼c. per lb.					

Messrs. R. C. HOFFMAN & Co., Iron and commission merchants, Nos. 23 and 25 South Frederick street, report the Pig Iron market as follows, under date of June 21: We have no change to report in the condition of the market. The same dullness and inaction prevails. We quote:

Baltimore Charcoal		$32·00 @ 35·00
Virginia	"	30·00 @ 35·00
Anthracite	No. 1	27·00 @ 28·00
"	No. 2	25·00 @ 26·00
"	No. 3	23·00 @ 24·00
White and Mottled		20·00 @ 22·00

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, Richmond, Va., writes as follows under date of June 22: Quotations of last week fully sustained. No flagging in inquiry for well known brands of Car Wheel Iron. Sales fully up to receipts. Brands not so well known are heavy, and are offered considerably below quotations.

Virginia cold blast Charcoal Pig Irons		$30 00 @ 35·00
" hot " " "		28·00 @ 32·00
Va. hot blast Coke Pig Iron,	No. 1 ex.	26·00 @ 27·00
" " " "	No. 2 ex.	25·00 @ 26·00
" " " "	No. 3 ex.	24·00 @ 25·00
Virginia Anthracite,	No. 1 ex.	27 00 @ 28·00
" "	No. 2 ex.	26 00 @ 27·00

FOREIGN.

FRANCE.

(Moniteur des Interets Materiels.)

PARIS, June 6, 1875.—*Metals.*—Although the latest failures announced from London are not large, they are sufficiently so to cause the European metal trade in general to be on its guard during these critical times. England having lost a vast amount of trade during the past year or two, especially in exporting Iron and its manufactures, a grand effort had to be made to force an outlet by means of consignments to the four quarters of the globe, but being undersold by the Belgians and other nations, these attempts have but led to further losses, and in many instances the goods either remain unsold or remittances are not forthcoming. What we are witnessing is, therefore, but the beginning of the end, the gradual decline of British Iron industry, precipitated by the ever recurring labor troubles. This decline which, from all appearances, is now at hand, could not have been brought about abruptly, the financial capacity of resistance being too great in England; but the evident success with which the Belgians have of late been underselling the English in their home market, has gone to prove that this is not a trifling matter to be easily overcome during the next ensuing general revival in trade. The weeding process has but commenced, and a good many more failures in the English Iron trade may be added to the list. Such, at least, is the impression here, at Paris, and great caution is engendered ther by in metal circles. *Copper.*—There has been a fair amount of business done in the French markets for actual consumption, while for general reasons just given speculation has apparently ceased to exist in any metal, including Copper. What has been assisting Copper more than anything else has been the steady consumptive demand both in England and on the Continent, while in the way of export from England to India not much could be done at present, this not being the season for it. Chilian charters for the latter part of May have been 1900 tons. We quote Chili Bars, deliverable at Havre, 215 francs; Common ditto, 210; Refined Ingots, 227·50; Tough Cake, 225; and pure Corocoro Ore, 215. Havre quotes Lake Copper 230 to 235. Marseilles is steady on the basis of 220, Ingots. *Tin.*—The European, and especially the French, Tin markets have been fluctuating during the week, the final tendency being rather upward than otherwise. The deliveries are understood to be on the most liberal scale at the leading centers, yet, as the supply is large, we dare not look for any very great improvement till a serious decrease in the arrivals and amounts still afloat can be shown. Though the Straits have curtailed shipments to London, Australia does not abate. Our own markets have been quiet, but steady. We quote, here, Banca, 232·50 francs; Straits, 230; and English 227 50, at Havre or Rouen. *Lead.*—While the English are by degrees losing their main hold on the world's Iron trade, they display the utmost activity in other metals elsewhere, particularly in Lead in the Peninsula. In fact all Spain, inasmuch as the Carlist disturbance does not prevent it, is being converted by them into a vast mining camp, and their success in stimulating the Lead output has been so unexpectedly great this year that the metal now declines pretty much as fast as it rose a couple of months ago, when the war demand caused a temporary improvement. Yet our own markets have remained tolerably well sustained, and we quote here, at Paris, French, 56·25 francs, and Spanish, at Havre, 55. Marseilles is quiet at 32. *Spelter* forms somewhat of an exception from the general rule, and remains scarce and wanted, with an inadequate supply to meet the increased consumption. We are consequently steady here at 62, best brands Silesian at Havre, and 62 secondary ones, while here we also quote 62 for the latter. Marseilles unaltered. *Iron.*—We are dull here, and with the sole exception of St. Dizier, the remainder of France is equally as stagnant. At St. Dizier Sheet Iron and Iron Hoops are doing well; the foundries there are also busy for the furnishing of architectural work for railroad stations and gas works. In Eastern France two large rolling mills are introducing differential trains, now more generally adopted. *Coal* is in a pitiful plight, and now breaking down completely pretty much everywhere in Europe, in France more especially; there is no saying where we shall stop.

BELGIUM.

(Revue Universelle).

BRUSSELS, June 6, 1875.—*Iron.*—The general aspect of Iron matters in Belgium is, on the whole, not a flattering one just at present; yet there are favorable signs as well as unfavorable ones, and they very nearly counterbalance each other; we mean the resumption of work by a great many establishments, and its suspension by others. But these are all but secondary concerns; the big ones go on as briskly as ever, there being quite a windfall of orders, arrived within the past few days, for Rails, Sheet Iron, Hoops and Puddled Bars from various foreign countries. All we require now is a heavier decline in Coal, so as to enable us to compete to still better advantage with the English, who have now begun, in some of their metal papers, to cast a slur upon Belgian Iron. This, however, is merely spite at our success in beating British Iron and manufactures out of foreign markets, for Belgium, in comparison with former years, now indeed turns out most superior qualities. Our consumers abroad fully understand this, and the best proof is that we are getting the orders. The Schlessin Company has obtained the Russian contract for the Volga Iron bridge, 3300 feet in length; work thereon will commence August 1, next. The new system of lighting railroad cars by gas, of J. Pintsch, Fe lin, attracts a good deal of attention in our country. *Coal.*—According to the official statement, Belgium exported during the first four months 1,200,000 tons Coal, nearly all to France, against 1,000,000 and 1,370,000 in 1874 and 1873, and imported 219,000, against 116,000 and 166,000 in 1874 and 1873, drawing thus far this year from England 150,000 and from the Ruhr country 40,000. Our large Coal mines try to uphold rates, but the small ones are less firm and bring down prices, precisely what we want to shut out English and German.

GERMANY.

(Borsenhalle.)

HAMBURG, June 5, 1875.—*Metals.*—Trade is, on the whole, still in an unsatisfactory condition, nor is the outlook a reassuring one. The shares of nine of the principal Iron and Steel companies had declined 37½ per cent. last year, and have not recovered since, while those of but one great machine establishment have from 144 improved to 168. Coal on the Rhine, which in 1872 commanded the equivalent of 10/8, rose to 14/ in 1873, and later on declined to 10/6, while the cost of production increased 40 per cent. in two years. In other words, while we realize considerably less for most of our mineral productions, rising wages have enhanced their cost very materially. *Copper* has, nevertheless, been tolerably well upheld, and is quoted between 91 and 93 marks at Berlin, 89 and 100 here, and 105 at Stettin. *Tin* has quieted down to 96 to 98 for Banca at Berlin, and 95 to 98 for English. We are steady here at 100 to 104. *Lead.*—Spanish production is bringing down prices. We are, nevertheless, firm here at 23·75 to 27, extreme range, while Berlin is weak at 21·50 to 23·50 for German. *Spelter* is still quite firm at 26 to 26·25 at Berlin, 23·50 and 24·50 at Breslau, and 24·50 to 25 here.

HOLLAND.

(Koch & Vlierboom.)

ROTTERDAM, June 8, 1875.—*Tin* has remained quiet, with but few transactions to report. Some Banca sold at 50¼ guilders.

CHINA.

(Arnhold, Karberg & Co.)

CANTON, April 23, 1875.—*Metals.*—*Lead.*—Very little has been done, but previous rates are well supported. There is no inducement for speculators to enter the market in face of the somewhat heavy supplies now on the way from England. *Tin* in small supply, and tending upward. *Quicksilver*—Stocks are very small, and holders in consequence command full rates at a rise of $6 per picul. May 7.—*Lead.*—Some speculative purchases of L. E. are reported at $7·55 to $7·60 per picul to arrive. Importers now ask higher prices in consequence of the advancing tendency of the London market, but speculators hesitate to raise their offers. From native sources there is scarcely any inquiry. *Tin.*—Only a retail business to report; prices are weak and tending downward. *Quicksilver.*—The market has been quite demoralized by the heavy supplies brought over from San Francisco and the sudden fall of £4 in Spanish at London. Importers have been pressing sales with very little success, and present quotations are more or less nominal. Supplies afloat are offered at $110 per picul without attracting any attention. We quote Lead from $7·55 to $7·85; Tin from $22 to $21·75, and Quicksilver from $1·22 to $1·25. Exchange on New York at 5 months' sight, 5 per cent. discount.

EAST INDIES.

(Aitken, Spence & Co.)

COLOMBO, Ceylon, May 4, 1875.—*Plumbago* of first-class quality is scarce. Demand limited; values unaltered. We quote Lump, free on board without freight, per ton 30/; Chip, 180/, and Dust, 120/. The market closes quiet, but steady. *Shipping.*—The Pandita is getting her cargo slowly, and will likely be ready about the middle of this month. In the present dull state of trade prospects of another vessel being put on are indifferent for some time to come. Export from the two Ceylon ports from Oct. 1 to date to the United States, 21,336 cwts., against 24,630 in 1874; to England, 43,048, and to the Continent of Europe, 1448. *Exchange* slightly in favor of sellers at 1 10⅞d. to 1 11⅛d.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

SHEFFIELD, ENG., June 7, 1875.

THE GREAT FAILURES,

which took place at the beginning of last week (and of which I have already sent you some account), have since been the leading topic of conversation throughout the country, and have had the effect of producing what the newspapers have been pleased to term a "commercial crisis." The suspension of Messrs. Gilead A. Smith & Co., with debts amounting to over £600,000, had been foreshadowed in city circles for several weeks before it actually occurred, and many who might have been creditors when the firm did actually suspend payment managed to "get out" by dint of dexterous manipulation, but others were not so well informed, and have been hit to a serious extent. Amongst others, the Phœnix Bessemer Steel Co. (Limited), near Sheffield, was what the commercial world slangily terms "let in" for nearly £15,000, the consequence being that it has had to petition for liquidation. Its capital is £100,000 and its trade liabilities are a little over £110,000. Other Sheffield firms are rumored to have been affected, but I have very good reasons indeed for supposing that no other creditors of Smith & Co. are to be found in this vicinity, and that therefore there is no cause for the semi-panic which has prevailed at Sheffield for several days. The failure of Smith's was, however, a mere flea bite to that of Sanderson & Co., bill discounters, agents &c., London, whose liabilities are set down at the modest total of a little over £5,100,000. A good deal of this will, however, I should suppose, run off as the bills of other firms arrive at maturity and are met. In connection with Sanderson's "smash" there resulted a breakup which, it appears, had been talked of in the city, but was a great surprise to the outside public. This was the case of Mr. Richard Fothergill, M. P., trading with a Mr. Hankey as the Aberdare and Plymouth Iron companies, South Wales. In this case the liabilities are estimated at about £1,500,000, with assets of at least that value if they can be properly realized. The concerns owned and worked by the firm appear to be these: Llwycoed, Abernant, Plymouth, Penydarran, Treforest and Aberdare Iron Works, with the collieries of Plymouth, Troedyrhiew, Aberdare and certain smaller undertakings. It is represented that for nearly 20 years the Aberdare and Plymouth concerns, although really belonging to the same owners, had been drawing bills on each other, the acceptances being usually discounted or held at call. Sanderson & Co. had the ill fortune to hold about £650,000 worth of this precious paper. The banks and others had at length grown suspicious, and by pulling the strings tighter brought on the catastrophe. Numerous complications arise out of the stoppage, as Mr. Fothergill had placed £100,000 worth of rail orders in the North of England during the strike. Bills drawn against the iron so produced are therefore running, but it has not been delivered, and the sellers consequently decline to let it go now. They had, however, sent the weight notes out to the consignees, who have treated them as warrants, and have obtained advances of money thereon, so that it is a very pretty legal point indeed as to whom the iron really belongs. The property of the defaulting Welsh companies is very valuable, there being five blast furnaces at Aberdare, ten at Plymouth, beside every other appliance for an enormous output of finished iron, rails, &c. The collieries have an output of fully a million tons per annum, and they are in an almost virgin field, containing all the best Welsh seams. On the day following, Mr. Edward Corry, a London metal merchant, succumbed with £300,000 worth of debts, and there have since been sundry stoppages for amounts varying from £30,000 to £60,000. I had meant to make certain further allusions to matters pertaining to this subject, but the space at my disposal being limited, I will somewhat unwillingly forbear for the present.

BRITISH RAILWAY ROLLING STOCK.

The great proportions to which the railway traffic of this nice little, tight little kingdom has attained are to be indicated by the following returns, just issued, showing the rolling stock of the various leading companies on June 30, 1874. The figures, as quoted by *Iron*, are as under: Engines, 10,526, first class carriages, 4491; second, ditto, 4419; third, ditto, 9754; composite, ditto, 4472; passenger break vans, 3583; traveling post offices, 97; tenders for ditto, 85; horse boxes, 3610; carriage trucks (open), 1972; ditto (covered), 184; goods break vans, 5416; goods wagons (covered), 13,781; ditto (open, high sides), 81,635; ditto (open, low sides, including timber and rail trucks), 101,767; coal, coke and mineral wagons, 94,991; cattle wagons (covered), 7137; ditto (open), 5049. The carrying capacity of the goods and mineral wagons is as under: 23 are made to carry 1 ton; 601, 2 tons; 12,009, 3 tons; 2280, 4 tons; 8119, 5 tons; 95,718, 6 tons; 37,225, 7 tons; 41,388, 8 tons; 94,053, 9 tons; 18,977, 10 tons; 230, 12 tons; 62, 15 tons; 8, 20 tons; 5, 25 tons; 3, 30 tons; 10, 40 tons; 2, 50 tons; 51,462 (various) from 1½ to 10½ tons. The immense number—10,526—of locomotive engines is distributed as follows: London and Northwestern, 1935; Northeastern, 1155; Great Western (broad guage, 120; narrow gauge, 998), 1118; Midland, 1007; Caledonian, 630; Lancashire and Yorkshire, 617; Great Northern, 505; Great Eastern, 460; North Brit-

ish, 449; Manchester, Sheffield and Lincolnshire, 342; London and Southwestern, 318; London, Brighton and South Coast, 254; and Glasgow and Southwestern, 220; the balance being made up by smaller companies." Among these, however, says *Iron*, "many points of interest present themselves—as, for instance, that the Metropolitan Railway possesses no more than 46, and the Metropolitan District Railway only 24 engines; while, on the other hand, one of the shortest, most active and best paying lines on our island—the Taff Vale—is credited with no less than 92 engines—a number explained by the enormous bulk of minerals sent down the line. The wear and tear of the immense mass of rolling stock catalogued above is very much less than is generally supposed. Repairs are needed from time to time by the best engines made, but with anything approaching fair treatment, the locomotive exhibits extraordinary tenacity of life. It is roughly calculated that an engine dies every day—no very great annual percentage on those in work, and which might be still further reduced were locomotive engines exposed to no rougher work than other species of the same genus.

THE SCOTCH PIG IRON MARKET

was greatly depressed at the commencement of business last week owing to the commercial failures in London and elsewhere, and warrants went down to 58/ on Tuesday. This is lower than warrant quotations have been since early in 1871, is 46/ under the price of May, 1873, 25/ below the figures of May, 1874, and 16/ cheaper than the lowest point reached six months back. On Wednesday, however, a slightly better tone prevailed, and on Friday 59/6 was the quoted price. The week's shipments were 9768 tons, slightly more than the total for the corresponding period of last year. Makers' brands fell somewhat, in consonance with warrants, and are still weak in price. The total stock in Connal's stores continues to augment, there being now over 38,000 tons on hand there, exclusive of such stocks as makers may have in their own yards. Freights to certain transatlantic ports have dropped, Glasgow and Ardrossan to New York being now 5/, to Boston 14/, to Baltimore 12/ and 15/ respectively, and Philadelphia 12/. Writing on June 4th from Glasgow, Messrs. James Watson & Co. thus report: "In the early part of this week the market was much depressed owing to commercial disasters in the South, business being done down to 58/ on Tuesday; but since then an improvement has taken place, and warrants close to-day at 59/6 buyers, sellers 59/9 cash. Shipments last week were 9768 tons against 7016 tons in the corresponding week of 1874. We quote:

	No. 1.	No. 3.
G. M. B., at Glasgow	61/6	59/6
Gartsherrie, "	65/6	62/6
Coltness, "	66/6	63/
Summerlee, "	65/6	62/6
Langloan, "	65/	61/6
Carnbroe, "	65/	61/6
Calder, at Port Dundas	65/6	62/6
Glengarnock, at Ardrossan	67/	62/6
Eglinton, "	61/	59/6
Dalmellington, "	61/6	60/6
Shotts, at Leith	66/	63/6
Kinnell at Bonces	64/6	59/6

Messrs. John E. Swan & Bros. (limited), prices are:

Glasgow Brands.	Furnaces Blowing, 123	Furnaces Out 34.	Furnaces Built, 157.	Prices. No. 1.	No. 3.	No. 4
Gartsherrie	14	2	16	65/	61/	62/6
Coltness	12	0	12	67/	63/	..
Summerlee	6	2	8	66/	61/6	62/6
Langloan	7	1	8	65/	61/6	62/6
Govan	4	1	5	62/	60/	62/
Calder	6	2	8	66/	62/6	62/6
Shotts Bess'mer	5	2	7	85/	..	..
Shotts Ordinary				66/	63/	62/6
Carnbroe	4	2	6	63/	61/	62/6
Wishaw	2	1	3	..	..	..
Monkland	8	1	9	61/6	60/	61/
Chapelhall				..	..	..
Clyde	6	0	6	61/6	60/	61/
Quarter-Clyde	4	1	5	61/	60/	60/

* f. o. b. Glasgow, 1/ per ton, extra.

Glasgow Warrants, 3-5 No. 1; 2-5 No. 3, g. m. b., 59/9

WEST COAST BRANDS—*f. o. b. Ardrossan.*

	Brand'd	Eglin'n				
Glengarnock			7	2	9	68/ 62/ 62/
Ardeer			4	1	5	
Eglinton			6	2	8	
Lugar			4	0	4	
Muirkirk			3	0	3	60/ 58/6 59/
Portland			3	3	6	
Dalmellington			6	2	8	61/ .. 59/

EAST COAST BRANDS—*f. o. b. in the Forth.*

Kinnell			3	1	4	62/6 59/6 59/
Almond			2	1	3	63/ 59/ 60/
Carron Selci'd			5	1	6	67/6 .. ..
Carron Ordn'y						65/ .. ..
Lochgelly			2	2	4	61/ 60/ 60/
Lumphinnans			0	2	2	.. .. ..
Bridgeness			0	2	2	.. .. ..

Messrs. Wm. Colvin & Co., Glasgow, 8th June, say: "The warrant market continued pretty steady at the end of last week, and the price advanced from 58/6 to 59/6, which was the closing quotation on Friday. Yesterday there was more desire shown to sell, and business was done from 59/3 to 58/6. To-day 58/6 was the opening price, and it receded to 58/, closing with sellers at that price, and buyers at 57/9. The undernoted prices of shipping iron are again rather lower.

	Delivered alongside. No. 1.	No. 3.
G. M. B., at Glasgow	60/	58/6
Gartsherrie "	65/6	61/
Coltness, "	67/	63/
Summerlee, "	65/	62/
Langloan, "	64/	62/
Carnbroe, "	61/	61/
Monkland "	60/	59/
Clyde "	60/	59/
Govan, at Broomielaw	60/	59/
Calder, at Port Dundas	65/	63/
Glengarnock, at Ardrossan	66/	61/
Eglinton, "	61/	59/
Dalmellington, "	61/	59/
Carron, at Grangemouth, selected	70/	..
Shotts, at Leith	66/	63/
Kinnell, at Bo'ness	63/	59/
Bar Iron	£8. 10/ to £9. 10/	
Nail Rods	£9. 10/.	

SHIPMENTS.

	Tons.
Week ending June 5, 1875	8,708
" June 6, 1874	5,360
Increase	3,348
Total increase for 1875	46,394

MIDDLESBORO' AND CLEVELAND.

The market in the Cleveland district, of which Middlesboro' is the acknowledged center, has been disorganized during the week, owing to the extent to which several of its firms are mixed up by the Fothergill failure. Uncommon complications are already spoken of, and it is feared that some firms, already not very well able to fight their competitors, will have to go to the wall. Prices of pig iron are easier, in consequence of the great drop in Scotch values.

THE SHEFFIELD TRADES.

It hardly needed the painful experience of this week to demonstrate that these are indeed trying times, nor were the disasters which have overtaken the Welsh and metropolitan firms by any means necessary for the purpose of deepening the feeling of mistrust which is everywhere prevalent. Persons and firms engaged in the iron trade hereabouts are thoroughly uneasy, and state that they hardly know how to move in order to be and remain safe. The local rumors, too, of which I have recently spoken have—perhaps as a collateral consequence of the gigantic failures announced on Monday afternoon—again become rife, and names are mentioned with so much freedom that there would appear to be some foundation for what is so generally stated. Of that, however, events will be the best judge. Meantime there is an almost total suspension of confidence, even in well known names, and a consequent limitation of business in all branches of trade. Rumors also reach me from certain iron trade sources of an expected great failure in a district much further north than this, the estimated liabilities being stated at seven figures. This, of course, may be but the wilful misrepresentation, or the unintentional exaggeration, to which even good business men may lend themselves at periods such as those when listeners and propagators are but too readily found. In any case, it will be well for commercial men generally if the present crisis passes over without more serious results than those already apparent.

The competition for rail orders is growing keener than ever, and fully justifies what is said of it by the directors of John Brown & Co. Current quotations for steel rails are £9. 15/ to £10. 5/; but an instance is mentioned in which a contract has just been placed at a couple of shillings under the former figures.

In other branches of industry I do not hear of any noteworthy change, many departments being irregularly employed. The cast steel trade is fairly well engaged, as also are the engineering, armor plate and edge tool shops, but in hardly any case is activity the rule. The brass and iron founders are, nevertheless, tolerably busy, much work being on hand at the brass foundries and the stove grate establishments.

The price of fuel continues to go down, but it is by very easy gradation. From a circular issued on June 1st by the Sheffield Coal Company I extract the following quotations: Picked branch, 13/9; best Birley Silkstone, 11/9; ditto picked "cubes," as sent to the London market, 12/4; screened Silkstone nuts, 6/9; screened seconds coal, 8/9; coke breeze, 10/; hard (washed) melting coke, 18/; and unscreened slack, 3/; all per ton of 21 cwt. at the pit heads. These figures show reductions varying from 3d. to 10d. per ton.

I have a circular from the Atherton collieries, near Manchester, which give much higher prices than those just enumerated. It quotes best Arley Mine coal at 19/2; best Atherton house coal, at 19/2; Crombonke, 16/8; and the Seven feet coal at 15/ per ton.

An important meeting of the shareholders of Brown, Bayley & Dixon, Limited, was held at the works, Sheffield, on Monday. After an interesting discussion as to the position and prospects of the company, it was agreed to raise £60,000 upon debentures of £15 each, and it was further resolved that the borrowed principal money owing by the company should not at any one time exceed £250,000. The prospects of the concern were stated to be very good.

In cutlery there is no great change, with the exception of the fact that some houses are not quite so well employed as they were prior to Whitsuntide. The pen knife cutlers, who have for several weeks been on strike from Joseph Rodgers & Sons' establishment, are taking steps to form an industrial co-operative society, in conjunction with one already in existence in the scissors trade. The shares are, I believe, £1 each. The Sheffield trades council have promised to assist the men in effecting these arrangements, if necessary, but it appears that the cutlers' union has ample funds for the struggle, which is not likely to last much longer. The file trade is somewhat irregular, some houses being only fairly busy, while others are greatly pressed with orders. It is probable that this branch of industry will not flourish greatly this summer.

SOUTH STAFFORDSHIRE AND BIRMINGHAM.

The iron trade proper of South Staffordshire is still exceedingly quiet, and finished iron prices are a little easier, consequent upon the diminution of business and the paralyzation of the market. Bars range from £8. 10/ to £11; hoops, £10. 10/ to £12. 10/; and sheets, £12. 10/ to £14. Makers of the best brands report themselves well supplied with orders, but the producers of inferior qualities are cutting prices exceedingly thin. Chains, cables and anchors are firm in price and in good request. Heavy iron washers are reduced 1/ per cwt. at Birmingham, and light are lowered to 60 off list. Common anvils are 23/ to 24/ per cwt.; "warranted" best, 27/; and "best" improved, tied on, 30/ to 43/. Certain sheet iron goods are advanced by 2½ per cent. discount. Common 12 inch galvanized buckets are 10/6 to 11/6 per dozen, weighing 34 to 36 lbs.; frying pans, 55½ per cent. off list; and shallow galvanized basins, 12 inches, 7/6 per dozen. Some of these prices are considerably shaded for heavy orders, there being an enormous amount of energetic competition in the trade. The wire makers of the district are becoming alarmed at the competition of Belgian and German firms, who are said to be delivering in Birmingham at 10 to 20 per cent. under home prices. Belgian railway spikes are also said to be £5 to £8 under Staffordshire quotations, and American bright headed nuts and bolts are 20 per cent. cheaper. *O tempora! O mores!*

THE SOUTH WALES DISTRICT.

The strike being now generally ended, the colliers are again almost universally at work, and, as a natural effect of the increased output, coal is rapidly falling in price. Dowlais has now eleven blast furnaces in operation, and at Tredegar, Ebbw Vale, and other great establishments, the long disused machinery is again getting in motion. The blow inflicted by the failure of Mr. Fothergill is very severe, and will, for a time, greatly limit the producing powers of the locality. Cyfarthfa is not yet fully engaged, nor is it likely to be so; indeed, a *further general reduction* of wages is by no means unlikely to take place.

THE METAL MARKETS

have been quiet this week, and there has been no very notable alteration in prices. The failure of Mr. Corry, a dealer in copper, early in the week for £300,000, did not very largely effect the market, but there was more caution shown in consequence of the other great stoppages. There are rumors that Australian tin has been "over-done," and that its present price is by no means remunerative to the venders.

Messrs. Van Dadelszen & North say: *Copper.*—Very little business has been reported in Chili bars, pending the advice of the charters for the last fortnight of May. G. o. b. realize from £82. 10/ to £83. A small quantity of picked brands, £83. 10/. Burra nominally, £87. 10/ to £88; and Wallaroo, £90. 10/ f. o. b. *Tin.*—The market has recovered somewhat from its depression, and there are signs of an improved demand. Straits is particularly scarce, the last prices paid were £84, cash, with buyers over. For forward delivery business reported at £83 to £83. 10/. Australian has advanced from £81 to £82. English remains steady, £90 to £91. The Dutch market unaltered. Banca, 50¼ n.; Billiton, 48d. *Tin Plates* are easier to buy, and for large quantities makers are willing to quote lower prices. *Lead* is somewhat easier. Good soft English pig, £22. 10/ to £22. 15/; Spanish, 22. 2/6. *Spelter.*—In the absence of stocks business is most difficult. Silesian common about £24 to £24. 5/; in out ports, £24. 5/ to £24. 10/. English quite nominal. *Quicksilver*, £12 per bottle.

The *Mining Journal* has the following remarks: "*Copper.*—A fair business continues to be transacted for *bona fide* requirements, but there is still an absence of speculation. The position of the market is unchanged, and the fluctuations in price have been extremely limited. The published statistics show that stocks have undergone very little change and are comparatively light. There will not be much Chili arriving during the next month or two, and should consumption in any degree increase, stocks must further decrease, and prices would probably advance. The Chilian merchants are not likely to overburden us by chartering heavily, as our market is not sufficiently strong to bear large supplies; beside, the price would again yield unless shipments from Chili are on a moderate scale. The Indian demand has fallen off very much, both for copper and yellow metal, but exports to India just now would arrive out of season; probably in a little time orders will be coming forward as usual. The imports from America up to the present time do not amount to much, neither has our market in consequence suffered, and, in the opinion of those best able to judge, is not likely to do so. Whatever the production of America in years to come may do, no one, of course, can say; but so far as regards this year, there is evidently no occasion for needless apprehensions. The demand and supply appear to be pretty equally balanced, and while this is the case, and money keeps cheap, the price will not go back a great deal; but, on the other hand, a little increased consumption would tend to harden prices, and if combined with speculation, would certainly drive up the market considerably. Chili charters were announced on late 'Change at 1900 tons. The repeatedly moderate charters must produce a beneficial effect upon the market, and sellers will no doubt be able to realize higher prices. Our market closes very steady, although at the moment there is very little doing. Burra, £88; buyers, £87. 10/. *Lead.*—The market has been easier, and prices of English, as well as Spanish, are somewhat lower; the imports of the latter are rather in excess of previous years. *Spelter.*—Foreign continues very scarce, the stock in London on June 1st being only 82 tons. The price has advanced, and sellers ask £25, spot, and £24. 5/ to £24. 10/ for arrival. *Tin.*—In tin there has been a variable market, but prices, on the whole, show a hardening tendency. The deliveries are extremely large, but there is such an enormous stock here that the good effect that would otherwise be produced is nearly lost. The difference in the stock is only about 80 tons compared with April. There is less Straits on the way by about 450 to 500 tons a month ago, but from Australia there is still a large quantity to come in, over 1000 tons. Our market closes firm at £84 for Straits and £82. 10/ for Australian. *Tin Plates.*—In the absence of orders sellers are prepared to make slight concessions."

LATEST LIVERPOOL PRICES ARE THESE:

Iron: f. o. b. in Liverpool, per ton.

	£	s.	d.	£	s.	d.
Merchant bar	8	7	6 @	8	12	6
Merchant bar, in Wales	7	17	6 @	8	2	6
Staffordshire	8	15	0 @	11	15	0
Hoop	9	15	0 @	11	0	0
Sheet	11	17	6 @	12	10	0
Nail rod	9	0	0 @	9	5	0
Bar, best crown	8	15	0 @	9	0	0
Boiler plates	11	5	0 @	12	0	0

Tin Plates: f. o. b. in Liverpool, per box.

	£	s.	d.	£	s.	d.
Charcoal, I. C	1	14	0 @	1	17	0
Coke, I. C	1	3	6 @	1	6	0

Copper: Delivered in Liverpool, per ton.

Bolt and Sheathing	£95 @	£96
Tile	88 @	00
Tough cake	90 @	00
Best selected	92 @	00

The Exportation of Iron.

The Philadelphia *North American* says:

When we began to contend for the ability of the United States to export pig iron to foreign countries, the idea was so novel as to startle at once both the free-traders and the protectionists. But being fully satisfied of our ground by a careful examination before we made the declaration, we proceeded to amplify it by asserting that the time would come when the exportation of iron would become as large and reliable a trade as that of wheat or cotton. Acting upon this idea persons both in America and England commenced arrangements for experimental shipments, while some extreme protectionists and free-traders felt themselves in honor bound to dispute the probability of the undertaking. Being satisfied that it was idle to attempt to reason with such a spirit, we took up the official reports of the Bureau of Statistics and showed that, instead of being a probability, the export of iron was an accomplished fact, and that every form of iron was regularly exported.

We will do the iron interests the justice to say that of all our manufacturing departments they were the first to begin the export trade after the inflated values of the war period had given place to lower ones, and to-day the official statistics show conclusively that they have made more actual progress in the export trade than any two other industrial interests combined. In this they have followed the advice we gave them in advance of all others, and in defiance of theorists of both sides, and they have done wisely. But the exportation of raw iron has made slow progress because the manufacturers have been persuaded that it is better to attempt to build up more advanced forms of the iron industry. Still we have at length the evidence in the *Bulletin of the Iron and Steel Association* that the export is permanently established. In the year 1872 the export of pig iron was 1477 net tons; in 1873 it was 10,104 net tons, in 1874 it was 16,039 net tons. The *Bulletin* does not give the statistics of the other raw forms of iron. But this will do, and we think our readers will agree with us that the figures fully sustain us, and indicate a growth of the export trade that is full of promise. During the same years the imports of foreign pig iron were: in 1872, 295,967 net tons; in 1873, 154,708 net tons; in 1874, 62,165 net tons. Thus while the domestic exports were increasing the foreign imports were diminishing with amazing rapidity.

Evidently the true method to break the determination to flood the American market with foreign iron had been discovered; that is to attack the enemy at his own door, for how could the English shipments flourish with the spectacle before the eyes of the English iron men of American pig iron becoming a reliable export? We have no idea that the foreign imported pig iron will entirely disappear for many years to come. There are certain kinds of foreign pig that the American manufacturers think useful to mix with the domestic iron, and the vagaries of commerce are so inexplicable that we import foreign articles of all kinds that are no better or cheaper than we make at home. But the one fact for which we contend is, that the true key to the permanence of our iron trade lies in the building up of a great iron export trade, which will operate as a relief to our domestic markets.

It is better to do this than to export enormous quantities of breadstuffs and provisions and get but little money for them. If we make up our minds to export all the raw products of our industry as fast as we can find foreign markets for them the furnaces will not be idle, the labor and capital will find employment, and the consumption of breadstuffs and provisions at home will leave less for export. Bread and meat converted into iron will bring us a better return than would the wheat shipped in bulk and the meat in gross. The *Iron and Steel Bulletin* estimates that at the close of 1874 we had on hand one million of tons of domestic pig iron, which was far beyond our wants or probable consumption. If one fifth of this were exported to various foreign markets the trade at home would be benefited. The necessity for some such measure as this is seen in the admission of the *Bulletin*, that as early as the beginning of June, 1873, it was discovered that the production was outrunning consumption, and in that month a convention held at Cleveland, Ohio, adopted a resolution recommending that production be restricted. This was so far done that of 665 furnaces 252 went out of blast before the close of the year. Still times did not improve, and on the 1st of February, 1874, of 701 completed furnaces 398 were out of blast.

Those who adopted the resolution did not seem to take into consideration the fact that, while the old furnaces were thus idle new ones were constantly being built. Thus the number of new furnaces built was 41 in 1872; 50 in 1873; 38 in 1874; and 46 in 1875, with many more projected. To be more specific, the States of Connecticut, New Jersey, Pennsylvania, Maryland, North Carolina, Kentucky, Indiana, Illinois, Wisconsin and Missouri reduced their production in 1874, while the States of Maine, Vermont, Massachusetts, New York, Virginia, Georgia, Alabama, Texas, West Virginia, Tennessee, Ohio and Michigan increased. It is manifest that this sort of management will never relieve the trade. Some States appear to watch their opportunity and push ahead whenever others stop. Hence we say emphatically that as a means of improving the trade stoppage of furnaces is a failure, and that some other method must be adopted. The method we have believed to be the exportation of pig iron to foreign markets wherever it can be done to any advantage at all. The English regulate their own markets by shipping the surplus to foreign markets. We must do the same. It is now a well established fact that there is in England a good and profitable market for all the charcoal iron we can export. And the superior quality of most of our American iron is such that we have no doubt if it were exported in sufficient quantities it would be as much preferred in England as American cotton is to Indian cotton. Everybody here seems to be deluded by the question of prices and cheapness, and entirely to lose sight of the superior tensile qualities of our iron, now fully known and recognized in England. The prevalent opinion in that country, especially among iron men, is that ultimately England must be dependent upon the United States for her supply of raw iron as she is for breadstuffs and provisions. And we are sometimes tempted to think it our own fault that it is not so already. We must go to work and make our foreign markets a means of relief to the domestic markets.

Remarkable Work In Silver.

A London paper, *Iron*, gives the following interesting description of some rare specimens of the silversmiths' art lately sold in that city:

The series amply illustrated the application of the silversmith's art to the purposes of domestic use and the ornament of the *dressoir* in the sixteenth and seventeenth centuries, from the plain old English rat-tailed spoon, of which there were many most quaint and curious specimens, to the grand old baronial salts, the tall cups and noble beakers, the stoups, peg tankards, and the rare mazer bowls. Among them was a beautiful silver gilt ewer, profusely ornamented with Elizabethan *repousse* work of fruit, foliage, and marine monsters, which is pronounced the finest piece of English goldsmiths' work for form and design ever submitted to competition. This very noble piece stands about 16 inches high, and bears the hall mark, quite distinct and perfect, of the Lombardic capital M, which gives the date of 1609—time of James I. The spoons formed an exceedingly curious and interesting feature in the collection. There were enough of the various patterns to furnish forth several tables in complete antique style—such as the quaint old flat-handled, broad-bowled rat-tails, so called from the tail shaped ornament on the back of the bowl; or the seal-headed spoons, most of which bore initials on the seal with the date, and one of which was unique, being all gilt and bearing the date mark S (Roman capital), which proves its pedigree from the year 1595 of Elizabeth. Then there were the superb Apostle spoons, some of foreign make, but the best of English work. Still rarer and more beautiful in the work were two spoons of foreign make, called trade spoons, each bearing a figure relating to the profession of the owner—one an arquebusier fully equipped; the other, a carpenter at work, the shank being finely twisted and embossed with a grotesque head and Judith holding a sword and the head of Holoferns. This last was made at Mayence. None, however, were more interesting for the distinctive character of the work than the Danish and Icelandic spoons. In all of these we notice the clever adaptation of natural forms for ornament; the scallop shell or the fir cone being carved upon the top of the shank, and in others cable work ornaments the handle. The betrothal spoons of Copenhagen work, 1667, with the initials enclosed by a wreath, and the letters S and D, to denote "son" and "daughter," were very interesting. Three spoons of old Icelandic work date much earlier, probably, and were excellent in point of design and work.

The saltcellars were specially noticeable as by far the finest of any not belonging to the ancient colleges and halls. First among these were the four grand old salts, once the property of the Society of Serjeants' Inn, known so long ago as the Fire of London as "the old salts," the set consisting originally of five, the top salt having been bought by Mrs. Abbott Lawrence, and now in America. These are of plain silver, nearly 4 inches high, circular in plan, and in form a sort of dwarf hour-glass shape, 5¼ inches diameter at the base. They have lost the date mark by long cleaning, but "Her Majesty's Lyon" remains on the under surface, so that they are not earlier than 1550. The "Bacon saltcellar" is a tall salt, parcel-gilt, and profusely ornamented with excellent Tudor work in fruit, foliage and dolphins, and on the foot is engraved, in Lombardic characters, "Nicholas Bacon, 1566." It bears hall mark 1553, and measures 7¼ inches high. Nicholas Bacon was the famous Lord Keeper, the father of Francis Bacon. Another salt of unique design and excellent work, of the early seventeenth century, was a double, high-standing saltcellar, in silver, the body cylindrical, with a cover ending in a pinnacle, and supported by four chimæræ on griffins' legs, the rim enriched with Elizabethan borders, standing about 15 inches high. This very elegant piece bears the London hall mark 1620. There were two mazer bowls in the collection, one made of the maple wood, from which the bowl is thought to take its name, the tree being called "maeser" in Dutch, and "masarn" in Celtic, while Spencer in the "Shepherd's Calendar," alludes to the mazer bowl "ywrought of the maple warre." The other was of silver, and considered to be Irish work of the fifteenth century. This was a bulbed bowl, ornamented with punched work, having two handles and eight bulbs, and is a very curious example. The wooden bowl resembles the two belonging to All Souls College, Oxford, which are known to be of the fifteenth century, as the gift of Archbishop Chichele, 1412. It is ornamented with a rim of silver, in dancette work, having a boss inside, on which is engraved a warrior's head with helmet. The date is considered to be the end of the fourteenth or beginning of the fifteenth century. This most rare and interesting object was actually found in a small village shop in Norfolk, where it had long been used as a money box.

The Valentine Iron Works, at Williamsport, Pa., have been in operation several days. They are at present running on small bar iron and wire, employing about 35 men. The pig iron used is from Western Virginia.

We call the attention of parties desiring the services of a patent agent to the card of Burke & Fraser in another column.

London Metal Market.

(From The Mining Journal.)

	£.	s.	d.	£.	s.	d.
Copper—₱ ton.						
Best Selected	90	0	0	91	0	0
Tough Cake & Tile	89	0	0			
Sheathing and Sheets	94	0	0			
Bolts	95	0	0	96	0	0
Bottoms	95	0	0	96	0	0
Old	80	0	0	83	0	0
Australian, Wallaroo	90	10	0	91	0	0
" other brands	88	0	0		—	
Chili bars, g. o b	82	10	0	83	10	0
Wire ₱ ₱.	0	0	11¾		—	
Tuiles "	0	1	0¾		—	
Brass—₱ ₱.						
Sheets	0	0	0	0	0	10
Wire	0	0	9¾	0	0	0
Tubes	0	0	9¾	0	0	11¼
Yellow Metal Sheathing	0	0	7¾	0	0	0
Sheets	0	0	7¾	0	0	0
Spelter—₱ ton.						
Foreign on the spot	24	10	0	—		
" to arrive	24	0	0	—		
Zinc—₱ ton.						
In Sheets	29	10	0	30	0	
Quicksilver—₱ bottle	12	0	0			
Tin—₱ ton.						
English Pig, common	97	0	0	0	0	0
Ditto Bars (in bris.)	91	0	0	0	0	0
Ditto Refined	92	0	0	0	0	0
Banca	86	0	0		—	0
Straits	84	0	0		—	0
Australian	84	10	0	0	0	0
* **Tin Plates**—₱ ₱ box.						
IC Charcoal, 1 qual.	1	12	0	1	13	0
IX " 1 qual.	1	19	0	2	1	0
IC " 2 qual.	1	11	0	1	12	0
IX " 2 qual.	1	17	0	1	18	0
IC Coke	1	4	0	1	6	0
IX "	1	10	0	1	13	0
Canada Plates ₱ ton.	17	0	0	18	0	0
" at works	16	0	0	17	0	0
Iron—₱ ton.						
Bars Welsh, in London	8	7	6		—	
" to arrive	8	5	0	8	7	6
Nail Rods	9	0	0		—	
Nail Rods, Staff'd in L'ndon	9	10	0		—	
Bars	9	10	0	10	10	0
Hoops	10	10	0	11	10	0
Bars at Works	8	10	0	11	0	0
Hoops ditto	9	10	0	11	10	0
Sheets, single, and plates	14	0	0	12	10	0
Pig, No. 1, in Wales	5	0	0	6	10	0
Refined metal ditto	7	0	0	8	0	0
Bars, common ditto	7	15	0	8	0	0
Do. merchant. Tyne or Tees	8	0	0	8	5	0
Ditto, Railway, in Wales	8	10	0	9	0	0
Ditto, Swedish, in London	16	0	0	—		
To arrive	16	0	0	—	0	0
Pig, No. 1, in Clyde	3	0	0	3	10	0
Ditto f.o.b., Tyne or Tees	2	15	0	3	0	0
Ditto, Nos. 3, 4, f.o.b.	2	13	0	2	15	0
Railway Chairs	4	0	0	4	10	0
" Spikes	12	0	0	13	0	0
Indian Ch'coal Pigs in L'don		0	0		0	0
Steel—₱ ton.						
Swedish, in kegs (rolled)		—			—	
Ditto (hammered)	19	10	0	20	0	0
Ditto, in faggots	20	0	0		—	
English, spring	18	0	0	22	0	0
Lead—₱ ton						
English Pig, common	22	10	0	—	0	0
Ditto, LB	22	15	0			nom.
Ditto, WF	23	10	0			
Ditto, Sheet	24	0	0		0	0
Ditto, Red Lead	24	10	0	—	0	0
Ditto, White	30	0	0	32	0	0
Ditto, Patent Shot	27	0	0		—	
Spanish	22	0	0			0

* At the works, 1s. to 1s. 6d. per ton less. Terne plates 2s. per box below tin plates of similar brands.
† Add 6s. for each X.

CORRESPONDENCE.

Iron Making in the Hudson River Valley.

The following communication will be read with interest. If our correspondent is in error in his statement or estimates we hope some of our readers will set him right through our columns:

To the Editor of The Iron Age: Noticing an article in a late issue of your really valuable paper, headed "How cheaply can Iron be made in the United States?" and giving a statement as to the cost of production in the Kanawha Valley, which is claimed to be only $17·50—certainly very low, much lower in fact than it is now being produced generally elsewhere in this country—your correspondent closes his article by asking the question, "Is there any locality in the United States that can make a better exhibit?" I answer yes; there is one point in this country, and that, too, in the Hudson River Valley, where when produced the iron will be in the market, without transportation, where it can be manufactured for considerably less than the price named.

The Hudson River Spathic Iron Ore Company have immense and really inexhaustible deposits of spathic ore—same as is used in various parts of Austria and Germany for producing natural steel and spiegeleisen—only about a half a mile from the Hudson River, which I understand is to be put into pig on their own property, they having purchased fifty acres of land on the shore for the erection of furnaces, and about half a mile of water front extending out 600 feet into the river to the channel bank, which will afford them all the dumping room for all the cinder produced for many years to come. Figures have been made by some members of the company, who are practical iron masters, with large and successful experience, as to the actual cost of producing pig at this location, and the figures and items are as follows, viz:

2½ tons of ore at furnace	$2·81
1¼ tons of coal	6·75
900 lbs. limestone	·30
Labor, interest and incidentals	5·00
Total cost of 1 ton pig	$15·06

Now, let us examine the items, and see if their figures are correct. Their ore is of several varieties, occurring in the same beds, viz., a brown hematite, really an altered spathic changed by the elements; a gray ore, which is a true spathic; band ore from 3 to 12 inches thick, and a slate ore variable in thickness and rich in lime—in all about 30 feet breast of solid ore, which can be quarried out like stone, and which requires no washing to free it from pebbles or dirt, consequently it can be produced very cheaply.

The ore will yield practically in the furnace, without roasting, about 43 per cent. of iron, they call it 40 per cent.; roasted it will yield over 52 per cent. of metal, so that 2½ tons will be ample for a ton of iron. The ore being well supplied by nature with lime, will require but little of that material to flux it, beside the company have immense ledges of limestone on their own property, in close proximity to the ore, and the quantity necessary will not cost them any more, if as much, as the price named. As for the coal, it will not cost them any higher than the amount stated, as their furnaces will be situated almost opposite the terminus of the Delaware and Hudson Canal, and the coal can be brought from that point, and all the other coal depots, directly to the works by water transportation. As for the quantity required, namely, 1¼ tons to a ton of iron, it will be sufficient, as their ores smelt very readily, requiring less fuel than any other iron ore in use. And now as to the item of $5 per ton for labor, &c. The company propose building two or more stacks, and their product will be not less than 80 tons of metal per diem; that being the case, the estimate of $5 per ton is ample. From the above analysis of the various items there is no doubt but iron can be made at the point indicated at the cost stated.

The writer has contended for years that the valley of the Hudson River was the place above all others in this country to produce iron profitably, for the reasons of the close proximity of the magnetic ores of the Highlands and Lake Champlain, and the rich brown oxides of Duchess and Columbia counties, and also the direct lines of communication to the coal fields, as well as for the reason that when the iron is produced there will be no need of miles of transportation to market, as there will be a ready demand for all the furnaces can produce right at their own doors, at a lower price and at a greater profit than can be expected from iron made in the interior. Conversing upon this subject not long since with one of the largest and most successful iron manufacturers, he freely admitted that the Hudson River Valley was the best place to make iron cheaply and profitably, and further said if he could transplant his furnaces from their present situation on the Lehigh to the Hudson River, he would gladly do so at once, but he had too much capital invested at that point to warrant such a change at present. The fact is, and it is being pretty generally admitted, that the future of the iron business of this country demands that furnaces be located where stock, ore, coal and limestone, &c., can be had cheaply and daily throughout the year, so that it will not be necessary to carry a six months' stock, and where there will be a constant demand for the furnace product without shipment over long lines of transportation to find a market.

The Hudson River Valley possesses all the requisites. The supply of ores, consisting of magnetite, hematite, carbonate and spathic, is abundant now, and yet they are only partially developed, and the proper fluxes, as well as the coal, is very convenient, and the time will come, and is not in the far future, when the bulk of the iron produced and consumed in the Middle and Eastern States will be made in this valley between Troy and New York city.

VULCAN.

Zinc Poisoning from Galvanized Iron.

The frequent and almost daily inquiries at this office in regard to zinc poisoning, galvanized pipes, and the use of sheet zinc for lining tanks, lead us to bring together in an article some of the more important facts in regard to zinc poisoning.

There has been all over the country a certain feeling of safety in the use of iron pipes, cisterns and cooking utensils which were covered with zinc, or as it is called, galvanized. This arose from the fact that iron was a safe metal to use for such purposes, and as zinc protected the iron from corrosion it was at once assumed that there was no further danger from any source. A more dangerous error could not exist. In many cases an apparent indifference in regard to the results seems to exist, which arose probably in part from the circumstance that the galvanized pipe had come into use for water conduction so rapidly and quietly that it was not generally known, among those competent to judge of its character, that it was being extensively employed; and also a popular idea has prevailed, and unfortunately still prevails to some extent, that the salts of zinc are not specially poisonous to the human system. Where or how this idea originated, it is difficult to understand. In small quantities they produce nausea, in larger they produce vomiting, with violent retching and great cerebral distress.

The protoxide and carbonate of zinc are the salts most commonly found in waters passing through galvanized iron pipes. The power of these substances as poisons is illustrated by the fact that fifteen grains of the protoxide, given daily to a dog, soon made the animal ill, *and killed it* in less than a week. Painters who use, and manufacturers who make oxide of zinc, suffer from its poisonous effects. It produces a colic, resembling that caused by lead, and which is known as *zinc colic*.

By far the most common compounds of zinc found in water which has passed through galvanized iron pipes are the protoxide, and the carbonate of the protoxide. These usually make their appearance in a few hours after water is first drawn from the pipes, and they continue to form so long as any zinc remains upon the interior.

As the processes of manufacture improved the coating of zinc upon pipes has been made thicker, and now the zinc has a considerable body, which, of course, greatly enhances the danger, as it affords a longer time for the coating to be removed, and the poisoning effects are protracted.

The editor of one of our scientific journals, in speaking of this subject, says: "We have in several instances had brought to us, *for chemical examination*, a whitish powder, alleged to have been taken from joints in the galvanized pipes, which we found, upon analysis, to be carbonate of zinc mixed with a little sesqui-oxide of iron. In one instance, *nearly half an ounce* of this salt was scraped from the interior of a galvanized pipe of 60 feet in extent, This powder, in minute quantities, produces exceedingly disagreeable effects upon the stomach and bowels—indeed, upon the whole system. We took *half a grain* in the evening an hour before retiring, and passed a very uncomfortable night. The disturbance is not alone confined to the digestive and assimilating organs, but all the secretions become affected, and a persistent metallic taste remains for a day or two. We are led to think that this mixed carbonate of zinc, formed under peculiar circumstances in water and in the presence of organic matter, is different from *calamine*, or the impure carbonate of zinc of commerce, and a more potent poison."

Near Boston cases of zinc poisoning from the use of galvanized iron pipes have been frequent. A single physician had no less than six cases under his care within the space of a few months. Dr. J. H. Smith, of Melrose, Mass., gives some particulars of a case of zinc poisoning which is of value in showing the character of the symptoms, and the extreme danger attending the use of zinc in connection with drinking water. He says, in a report on the case:

"I beg leave to submit the following cases occurring in my practice: Mr. W. P. Sargent, chairman of the Board of Spot Pond Water Commissioners in this town (Melrose), connected his well and a force pump in the kitchen with upward of 70 feet of 1¼ inch *galvanized iron pipe;* and to facilitate the working of the pump, a large reservoir constructed of *galvanized iron* was placed near to it. Without entering into the details of the minor ailments of the family during the past twelve months, obviously resulting from *zinc poisoning*, but which were not sufficiently alarming to be brought to the notice of the physician, it may be stated that in November last the two daughters were seized with a peculiar and persistent inflammation of the throat, with extensive ulceration of the throat. While convalescing, the youngest, aged 5½ years, began to present indications of some unusual derangement of the nervous system. On waking in the morning, for about ten days, there was entire inability to move the head and limbs, with extreme sensibility of the whole surface to contact. For 24 hours severe croupy condition, symptoms of paralysis of certain nerves continued. In the evening there was inability to support the head, great emaciation, complexion bluish white. On the 15th of December, from the general correspondence of the symptoms with the records of *zinc poisoning*, the diagnosis and treatment became clear. On the same day the only son, aged 13, a very delicate child, was indisposed from what had been thought a cold. On Friday, the 16th, he was no better, but dressed and lying on the sofa. Complained of occasional pain on rising, continual nausea and entire loss of appetite, with disgust at the sight of food. Sunday morning, vomiting of bile, and indications of intense nausea. There was absence of pain or complaint to the hour of his death. Only milk was retained, of which a little was taken at intervals. Tuesday morning at 6 o'clock *he died very suddenly*, soon after passing about a gill of disorganized blood at stool. There was slight thirst before death, and faintness." A *post-mortem* examination, made by Dr. G. M. Pease, of Boston, and others, confirmed the opinion that the action of the zinc on the nervous centers, inducing paralysis of the heart, was the immediate cause of death.

Dr. Chas. T. Jackson, at that time State Assayer, reported: "The water from Mr. Sargent's pump is charged with a very large quantity of the oxide of zinc and a little iron," and that "the zinc renders the water dangerous to health." At the time of his analysis the Doctor was not only ignorant of the sickness in Mr. Sargent's family, but also of the source and medium of conduction of the water.

The Doctor, among other cases of less interest, makes brief mention of the following: "A gentleman while drinking water conducted by a galvanized iron pipe only 30 feet long, had constant dull frontal headache, with occasional attacks of vertigo, preceded by sharp pressure at the root of the nose, and a sensation of drawing together of the eyes, followed immediately by nausea, faintness, and trembling of the hands and weakness of the legs. Examination of the pipe, ordered to be removed from the well, showed a thick incrustation, throughout its whole inside, of a white substance on uncorroded iron, with no traces of its metallic zinc covering. This white powder, analyzed by Dr. J. R. Nichols, chemist of Boston, was found to consist of carbonate of zinc with a little oxide of iron. This pipe was put in position about six years ago, and more or less water which passed through it has been used in the family."

He remarks in conclusion, "these cases, with many others occurring in this vicinity, show that zinc is a *slow* but *fatal poison*, when introduced into the system through the medium of water, and will serve to put families on their guard against the use of water flowing through galvanized iron pipes."

A gentleman residing at Sturgis, Michigan, a physician, gives the following account of the manner in which a comparatively short length of galvanized pipe produced symptoms of zinc poisoning in a whole family. He says: "I have in my house a water cistern holding one hundred barrels or more. In the bottom of the cistern is a filter, through which the water has to pass before entering a small cistern where the pump is. I then made use of a galvanized iron pipe, thirteen feet in length, attached to the pump through which we procured the water used for culinary and drinking purposes. In the spring of 1870, the first ill effects were noticed, which were manifested by a continuous dull pain across the forehead, over the frontal sinuses, accompanied with extreme sensibility of the cartilage of the ear and nose, so severe that the least friction or bending of the ear or the nasal cartilage would cause acute pain. Then came stiffness of the joints, with sharp, lancinating pains above the joints, always transverse, not lengthways of the limb. Pressure on the joints produced soreness and pricking pains, which would last for some minutes.

"This was continued until about the first of September, 1870, when I thought the trouble might in some way be connected with the use of cistern water. I then had my cisterns cleaned and washed, leaving the zinc pipe, which on the outside did not appear to be much corroded.

"We now closed our house, leaving the conducting pipes so as to carry the water into the larger cistern. We were absent one month, or until the 8th day of November. During our absence the bad symptoms nearly all disappeared, and we considered ourselves quite well.

"In our absence sufficient rain had fallen to fill the cisterns more than half full, and the water appeared very pure. We now began to use the water for all purposes again; and in about one week the old pains and troubles returned with increased violence; and in addition, a severe pain in the region of the heart was experienced, with a slight swelling externally, and great tenderness over the cardiac region.

"I now became convinced that we were suffering under the influence of some slow poison; and that probably it was due to the oxide of zinc found in the galvanized water pipe. From this time we discontinued the use of the cistern water, and in a short time we both began gradually to improve in health, and now consider ourselves well, with the exception of a slight stiffness of the knee joints.

"On removing the pipe from the cistern it was found corroded, and the zinc covering removed. The portion immersed in water was corroded in a spiral form, and so far oxidized that a portion fell off upon exposure to air."

In England, in the vicinity of Lancashire, zinc has been used for milk pans, and at first they were much liked as the cream separated from the milk very easily in them, and hence rose quickly. But the zinc was quickly and constantly corroded by the acids of both milk and cream, and the zinc salt found its way into the butter; many persons were made sick, and, being attacked in a peculiar manner, the cause of the disease was traced to the use of the butter contaminated with the zinc salts. A number of the cases were fatal. The public authorities, when the cause was ascertained, interfered, and prohibited the use of zinc milk pans under a severe penalty.

Dr. J. R. Bronson, of Boston, gives a very interesting history of a lady who was nearly killed by the poison of galvanized water pipes. He says, "a galvanized submerged pump, from which all the water used on the premises was drawn, was examined on suspicion, and its condition inspected. The zinc coating over a portion of the surface had been entirely removed, and over the remainder was thoroughly corroded so as to be easily removed with the finger, and after drying deposited a fine white powder, which I considered carbonate of zinc. The lady continued in a critical condition for several days. I was enabled, by active, efficient means, to improve the heart's action speedily, but the nausea and distress at stomach and glandular mucous secretions were obstinate in yielding to means administered; the power to use and control the lower extremities continued to embarrass her exceedingly for six weeks." Dr. Bronson adds:

"I was incredulous somewhat in regard to the alleged danger of galvanized iron in water conduction, having never before seen a case where I could trace any effect from its action, and, in short, did not comprehend so fully the situation as a subsequent study of the subject has convinced me its importance demands. I have since treated a case entirely unlike the aforesaid, both so far as the physical condition of the patient, and the effects as manifested thereupon are concerned, which I will report at an early day."

It sometimes happens that where galvanized pipes are used, severe cases of sore mouths occur, differing from common canker in having more severe and extended inflammation. The immediate cause seems to be the formation of a chloride of zinc in the water. This is very caustic and produces symptoms of this kind even when taken in small doses.

As long ago as 1808, Doctor Charles T. Jackson, wrote the following in answer to a letter of inquiry:

"In reply to your note of this day, asking my 'opinion of the merits of galvanized iron pipes for water conducts,' I would say that the iron is protected by the more ready oxidation of the zinc, and that the oxide of zinc is largely dissolved by water, rendering it unwholesome. In several instances I have detected large proportions of oxide of zinc in water that has remained over night in galvanized iron pipes and, in one instance, a gentleman who brought me such water said it produced in him much nausea. The water analyzed was found to be highly charged with oxide of zinc. It is well known that when zinc covered roofs were first introduced in Boston, and rain water from them was used for washing, that the washerwomen complained that the water made the skin of their hands crack, and that the rain water from zinc roofs was hard and decomposed the soap. It is also known that the French government has recently forbidden the use of galvanized iron water tanks in their ships of war, on account of the injurious effect of the dissolved zinc on the health of the men. All this shows that the galvanized iron pipe is not suitable for water conducts.

"C. T. JACKSON, M. D. State Assayer."

Mr. R. Rawlinson, before a Royal Commission, testified as follows in regard to zinc lined pipes:

"Galvanized iron pipes are not to be recommended. They cost forty to fifty per cent. more than plain pipes, and the galvanizing is a delusion. If the pipes are laid in subsoils which will act upon iron, the galvanizing affords no protection against that action, and there are soils which will rapidly eat away, either iron or lead. If you examine a galvanized iron pipe under a microscope, you will find that it is not an even coating; it is freckled, and there are interstices where oxidation sets up, and then the galvanizing is blistered off; it does not improve, and, even so far as it does cover it, I doubt very much whether it preserves it; it is not stronger in its texture, and it certainly does not last longer; that is my experience."

Dingler's Polytechnic Journal (German) says that zinc tanks and roofs "*invariably* and *rapidly* contaminate water with which they come in contact, by the formation of soluble salts of the metal, which are exceedingly poisonous." It recommends that zinc surfaces thus exposed to the action of water should be covered with a coating of asphalt varnish. The warning and the recommendation are endorsed by the London *Chemical News*, another journal of equally high authority. Of course, the danger from zinc as a coating of iron tanks and pipes is even *greater*, on acount of the *galvanic* action.

A Colossal Statue in Beaten Copper.—Some thirty or forty years ago, when the Unity movement had barely commenced, Herr Ernst von Bandel, a Westphalian nobleman, devoted to the sculptor's art, conceived the patriotic idea of erecting a gigantic statue to Hermann, the vanquisher of Varus in the Teutoburg Forest. A grand national monument, the statue was to reach the enormous proportions of 100 feet, not to speak of pedestal and base; and as it was to be placed on the top of a hill, the site of victory, the difficulty of getting it in position not a little added to the magnitude of the undertaking. In spite of all obstacles, what appeared a chimera thirty years ago has now become a reality. Assisted by wealthy friends and occasional public subscriptions, Herr von Bandel has completed the figure, and in two months expects to witness the solemn inauguration of his monument by the German Emperor. The statue is of embossed copper, and has been wrought by the hand of the man whose brain created it. His whole life has been consumed in this one object. When he had done modelling—no small task in the case of a figure with hands 5 feet long—he took to the hammer and forge, and literally formed the immense surface with his own unaided strength. A good deal of it was done at the foot of the hill whereon it stands, the sculptor having built himself a forge and a hut close to his chosen locality. To judge from the head, which was exhibited ten years since, Germany will possess not only the largest but also one of the best statues in Europe. This eighth wonder of the world will tower over the famous oak woods near Detmold, the capital of the principality of Lippe. The figure of an eagle wrought in copper in the same way was shown in London a few years ago at one of the internat onal exhibitions, and was afterward on view for some time at the Crystal Palace.

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No. 2, "	165 "	½x3	" ¾	" " ..... "	50·00
No. 3, "	350 "	¾x4	" 1	" " ..... "	75·00

This is by far the most powerful Iron Cutter in use which can be worked by hand, having three times the capacity of any other machine which sells at the same price. The No. 3 machine occupies a space of 12x30 inches; when in use additional space must be had for the lever to work in. We send two sets of knives with each machine—one for square and flat, the other for round iron and steel. By using the knives adapted to it, round iron is cut without being flattened. One man can cut the largest size iron named above, but two would be required for steady work. It does not take a minute to change the knives or to shift the machine from large to small sizes.

AUGUSTA, GA., March 3, 1875.

MILLERS FALLS CO.—Enclosed find draft for amount of invoice, January 7. We would have sent the amount before, but did not have an opportunity of trying the Iron Cutter until a few days ago. It is one of the best machines we ever saw. Yours, truly, MOORE & CO.

Office of the ATHENS FOUNDRY AND MACHINE WORKS,
ATHENS, GA., February 18, 1875.

H. L. PRATT, President.—Dear Sir: Enclosed find draft made payable to your order by Messrs. Childs, Nickerson & Co., in payment for Iron Cutter. We have put our Cutter to good service, and find it cuts readily 1¼ round, and 3½ x ⅝ square iron. C., N. & Co. are pleased with theirs, say it will save many a blow and cold chisel in their iron house.

Truly, yours, R. NICKERSON, Agent.

We make a satisfactory discount to dealers, and warrant the cutters to do all which we claim for them. Send for prices.

Millers Falls Company,

No. 78 Beekman Street, New York,

Sole Proprietors and Manufacturers of the

Barber Self-Fitting Bit Braces, Millers Falls Vises,
Improved Angular and Ratchet Drilling Machines,
TUBE SCRAPERS, FAMILY TOOL CHESTS,
Patent Adjustable Tool Holders, Mitre Boxes, Ratchet Braces, Breast Drills, etc.

The Fisher & Norris Eagle Anvil Works.

(ESTABLISHED) 1843.

These Anvils are manufactured at the oldest Anvil Factory in this country They are *superior* to the best English, or other Anvils, on account of the peculiar process of their manufacture (invented and used only by this concern), and from the quality of the materials employed.

The best English Anvils, after a time, become hollowing on the face by continued hammering in use, on account of the fibrous nature of the wrought iron—causing it to "settle" under the face.

The body of the Eagle Anvils being of crystallized iron, no such settling can ever occur; and the steel face, therefore, remains perfectly true. Also, it has the great advantage, that being of a more *solid* material, and consequently with less rebound, the piece being forged receives the full effect of the hammer, instead of a part of it being wasted by the rebound, as with a wrought iron anvil. An equal amount of work can, therefore, be done on this Anvil with a *hammer one-fifth lighter* than that required when using a wrought iron anvil which is more elastic.

The working surface is in *one piece* of JESSUP'S BEST TOOL CAST STEEL, which, after being accurately ground, is hardened and given the proper temper for the heaviest work. The *horn* is covered with and its extremity made *entirely of steel*. The body of the Anvil is of the strongest grade of American iron, to which the cast steel face is *warranted to be thoroughly welded and not to come off*.

REDUCED PRICE LIST. ANVILS weighing 100 lbs. to 800 lbs., 11c. per lb.

Smaller Anvils, ("Minims.")

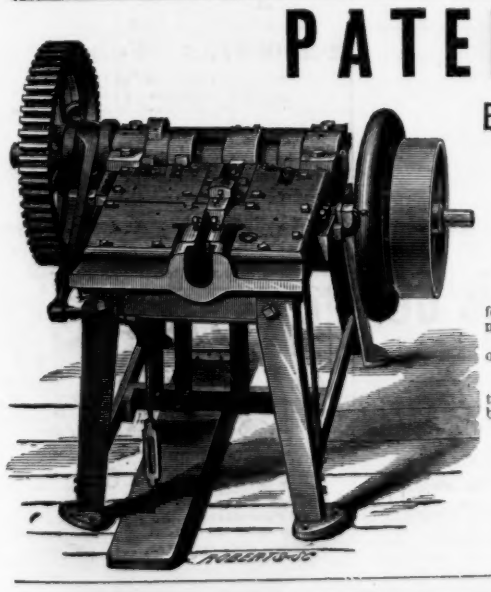
No.	0	1	2	3	4	5	6	7	8	9
Weighing about	10 lb.	15 lb.	20 lb.	30 lb.	40 lb.	50 lb.	60 lb.	70 lb.	80 lb.	90 lb.
Price, $3·50		$4·25	$5·00	$5·50	$6·50	$7·50	$8·00	$9·00	$10·00	$10·50

THESE GOODS ARE SOLD BY THE GENERAL AGENTS (with special discounts to the trade).

New York.—Messrs. J. CLARK WILSON & CO.—RUSSELL & ERWIN MANUFACTURING COMPANY.—Messrs. HORACE DURRIE & CO. Boston.—Messrs. GEORGE H. GRAY & DANFORTH. Philadelphia.—Messrs. JAMES C. HAND & CO. Baltimore.—Mr. W. H. COLE.

FISHER & NORRIS, Trenton, N. J.

PATENT BOLT HEADER



Every Railroad Shop, Car Shop, Machine & Bolt Shop, Mower, Reaper & Plow Manufacturer, should have one.

Three sizes of these machines are made, viz:

No. 1 will make bolts from ⅛ inch down.
No. 2 " " ¾ "
No. 3 " " 1¼ "

The three sizes if run together would require from 2 to 2½ horse-power.

The variety of shapes that can be made are only limited by the ingenuity of the owner. A few minutes only are required to make a change from one shape or size to another. All dies are made of the best Cast Steel, and can be redressed many times.

T, Button, Countersunk, Rivet and Round Head; Plow and Track Bolts, &c., are made at one revolution. Square and Hexagon Heads require from 3 to 5 revolutions.

For Simplicity, Durability and Compactness it has no equal.

A Boy can learn to run it in a few hours. The bolt is made on the heated bar and cut off in the machine to any length from 1 to 10 inches; if greater lengths are desired, they should be cut before heating. Either Round or Square Iron may be used.

Will use up as much iron as can be heated in any ordinary blast fire.

For prices and further particulars, address,

WILLIAM GARDNER'S SONS,

575 Grand & 414 Madison Sts., N. Y.

OLIVER'S CHILLED PLOWS.

These implements, though but four years before the public in their present form, show the following remarkable record:

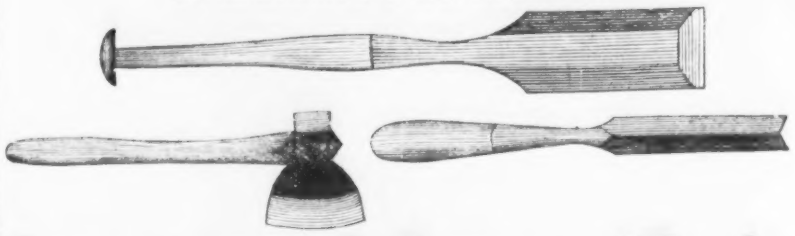
1506 were sold in the season of 1871. 7472 were sold in the season of 1873. 30,000 will be made for the season of 1875.
3049 " " " 1872. 14,976 " " " 1874. For full descriptive circulars, address,

SOUTH BEND IRON WORKS, South Bend, Ind.

MACK & CO.

Successors to
D. R. BARTON & CO.,
At the Old Stand, 136 Mill St., ROCHESTER, N. Y.

Sole Manufacturers of the
D. R. BARTON & CO. BRAND OF



Carpenters' & Coopers' Tools.

All goods stamped **D. R. Barton & Co.**, are made at the Old Works, and by the old men, from the Best English Steel, manufactured for by us by Thos. Firth & Sons and Wm. Jessop & Sons, and fully warranted.

Goods stamped **D. R. Barton** are not made at the Old Works of the company, but by a new stock company, formed about the time of Mr. Barton's decease.

TRADE MARK D. R. BARTON, 1832. ROCHESTER, N. Y. REGISTERED.

ONLY GENUINE
"D. R. Barton" Edge Tools,
Manufactured by
D. R. BARTON TOOL CO.,
Cor. Mill and Furnace Sts.,
ROCHESTER, N. Y.
CHARLES C. BARTON, President.

Goods Stamped "D. R. BARTON & CO." are neither Made, Sold nor Warranted by us.

The Celebrated DUBUQUE.

Acknowledged by all to be the Standard Soft Coal Burner of the West.

1. It is all cast iron—simple in its construction, and no machinery to get out of order. 2. It is a perfect gas and smoke burner. 3. It is the most powerful heater. 4. The fire is under perfect control at all times. 5. It combines the revertible flues and exposed fire chamber, and clinkerless grate. 6. It ventilates the room perfectly. 7. No dust or ashes escape into the room while managing it. 8. Has shaking and dumping grate with ash drawer. 9. The fire-pot being exposed to the cold air and made in two parts will outlast any in use. 10. The fire will keep from 20 to 30 hours without replenishing. 11. The parts directly exposed to the fuel can be replaced with but little trouble and expense. 12. Its operation is perfect with the poorest coal found in the West. 13. All parts of the base are heated perfectly. 14. Its beauty of design gains for it admission into any parlor. 15. It is especially adapted for the use of a Tea-kettle, from which boiling water can be had in a few moments.

The Manufacturers have made it a specialty for the past seven years. It is guaranteed in every respect to be a perfect Soft Coal Burner and without a rival. Send for Samples and Catalogues to

BURDETT, SMITH & CO.,
253 River St., Troy, N. Y.
62 Lake St., Chicago, Ills.

Pomeroy, Peckover & Co.,
Cincinnati, O.

Benjamin Fisher,
Wheeling, W. Va.

John G. Rollins & Co.,
Old Swan Wharf, London, Eng.

MAGENS & CO.,

73 Third Street, Louisville, Ky.

Representing MORRIS, TASKER & CO., Philadelphia, Pa.

Manufacturers of

Wrought Iron Pipe, Lap Welded Boiler Tubes, Gas and Steam Fitters'

MATERIALS of all kinds.

Agents for Blake Steam Pump, Shive Governor, Utica Steam Gauge and Keystone Portable Forge. We handle only M., T. & Co.'s Tube, which we guarantee to be of standard weight. Every length stamped with the trade mark of M., T. & Co. Send for Catalogue and Prices.

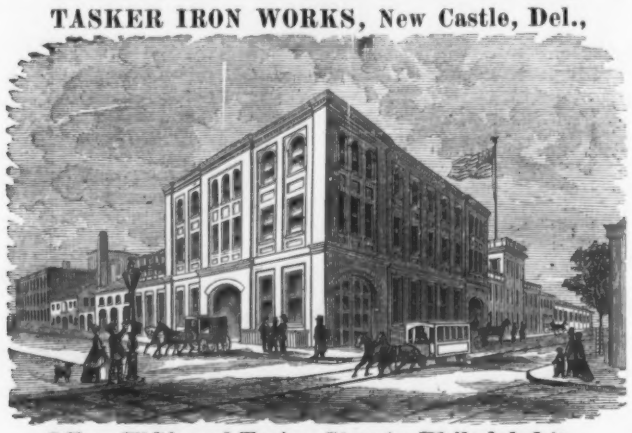
Pipe, Fittings, &c.

Thomas T. Tasker, Jr. Stephen P. M. Tasker

MORRIS, TASKER & CO.,

PASCAL IRON WORKS, Philadelphia,

TASKER IRON WORKS, New Castle, Del.,



Office, Fifth and Tasker Streets, Philadelphia.

Office and Warehouse, No. 15 Gold Street, New York.

Office and Warehouse, No. 36 Oliver Street, Boston.

MANUFACTURERS OF

WROUGHT IRON WELDED TUBES,

Plain, Galvanized and *Rubber-Coated*, for Gas, Steam and Water.

Lap-Welded Charcoal Iron Boiler Tubes.

Oil Well Tubing and Casing, Gas and Steam Fittings, Brass and Steam Fitters' Tools, Cast Iron Gas and Water Pipe, Street Lamp Posts and Lanterns, Improved Coal-Gas Apparatus, Improved Sugar Machinery, Etc.

BAILEY'S PATENT ADJUSTABLE PLANES.

IRON AND WOOD. 30 different styles.. 90,000 ALREADY IN USE.

Smooth Planes,
Jack Planes,
Fore Planes,
Jointer Planes,
Block Planes,
Rabbet Planes,
Circular Planes.

[No. 9½ Excelsior Block Plane, $2 00.]

Carpenters,
Cabinet Makers,
Car Builders,
Carriage Makers,
Millwrights,
Wheelwrights,
All Use them.

Manufactured by the **STANLEY RULE & LEVEL CO.,**

Factories: New Britain, Conn. Warerooms: 35 Chambers Street, New York.

Ecton Mills Genuine London TURKEY EMERY.

TRADE MARK.

ABBOTT & HOWARD, Agents for the United States.

81 John Street, New York. 35 Oliver Street, Boston.

EATON, COLE & BURNHAM CO.,

58 John Street, New York.

MANUFACTURERS OF

Wrought Iron **PIPE,** Cast Iron FLANGED PIPE, **Cast Iron** RADIATORS and BOILERS.

Brass & Iron **STEAM** Gas & Water FITTINGS. PLUMBERS' MATERIALS.

STEAM GAUGES, TOOLS,

And all Supplies used by Machinists, &c.

TRADE MARK

PAGE'S PATENT MAY. 8. 1866.

HOUSE ESTABLISHED, 1862.

GEORGE S. FALES,

SUCCESSOR TO

FAIRBROTHER & FALES

Sole Owner and Manufacturer of

Page's Patent Lace Leather,

And Manufacturer of

OAK BELTING,

Also, Picker or Moccasin Leather, for Boot and Shoe Packs.

Angular Belting and Pullies made to order.

PAWTUCKET, R. I.

Ask for Star Stamped Lace Leather.

New Patent "X" Razor Strap.

PATENTED DECEMBER 23, 1873.

This Strap, designated on our List as Letter "X," is of novel construction—is elastic, pleasantly yielding to the razor—gives a keen fine edge—is made of superior stock—is furnished at a low price—**and gives universal satisfaction.**

☞ ITS PRICE SELLS IT. ☜

BENJAMIN F. BADGER, Sole Manufacturer,

Badger Place, Charlestown Mass.

Pipe, Fittings, &c.

WROUGHT IRON

INDESTRUCTIBLE ENAMELED PIPE

For Water, Gas, Sewage & Soil Pipe.

Manufactured Solely by

NATIONAL TUBE WORKS CO.,

Also Lap Welded Steam & Gas Pipe & Boiler Tubes.

Tubing & Casing for Artesian, Oil & Salt Wells (with Patent Protecting Coupling),

A Specialty made of Large Wrought Iron Lap Welded Tubes, 8 in. to 14 in. diameter.

MACK'S PATENT INJECTOR, ETC.

Works and Offices at BOSTON, MASS., and McKEESPORT, PENN.

OFFICES AND WAREHOUSES,

New York, 78 William Street. | Chicago, 112, 114 & 116 Lake Street.
Buffalo, 216 Main Street. | Cincinnati, 119, 121 & 123 Pearl Street.

McNab & Harlin Mfg. Co.,

MANUFACTURERS OF

BRASS COCKS

For STEAM, WATER and GAS.

Wrought Iron Pipe & Fittings, Plain and Galvanized

PLUMBERS' MATERIALS.

Illustrated Catalogue sent by express to the Trade on application.

Factory, Paterson, N. J. 56 John Street, N. Y.

PANCOAST & MAULE

227 Pear St.

PHILADELPHIA.

WROUGHT IRON PIPE

FITTINGS, BRASS & IRON VALVES & COCKS

TOOLS & STEAM FITTERS SUPPLIES &c.

PIPE CUT & FITTED TO PLANS FOR MILLS &c.

CONTRACTORS

FOR HIGH & LOW PRESSURE STEAM HEATING APPARATUS FOR ALL CLASSES OF BUILDINGS.

Send for Illustrated Catalogue.

WM. ESTERBROOK,

Wholesale Manufacturer of

Coal Hods,

FIRE SHOVELS, Etc.

311 Cherry St., PHILADELPHIA.

CAST IRON PIPES

FOR WATER AND GAS.

Branches Retorts, &c.

Warren Foundry & Machine Co.,

PHILLIPSBURG NEW JERSEY.

GEORGE BARNES & CO.,

Manufacturers, Syracuse, N. Y.

ENCAUSTIC TILES.

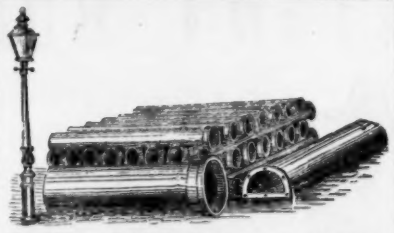
ALEXANDER FINDLAY,

Importer.

99 MAIDEN LANE, N. Y.

Sole Agent in the U. S. for

CRAVEN, DUNNILL & CO., (Limited.)



R. D. WOOD & CO.,

Philadelphia,

Manufacturers of

Cast Iron Pipe

FOR WATER AND GAS.

Lamp Posts, Valves, &c.,

Mathew's Pat. Anti-Freezing Hydrants.

400 CHESTNUT STREET.

Chapman Valve Mfg. Co.,

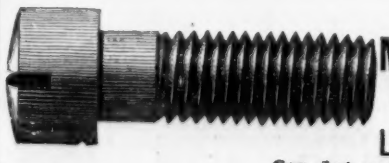
STEAM VALVES,

Iron and Composition, of all sizes.

WATER and GAS Gates, 3 to 48 inches

HYDRANTS.

Office and Warehouse, 75 & 77 Kilby St., Boston, Mass

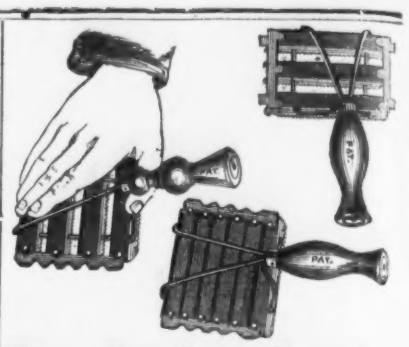


TURNED MACHINE SCREWS,

One-sixteenth to five-eighths diameter.
Heads and points to sample.
IRON, STEEL and BRASS.

Lyon & Fellows Mfg. Co.,

Cor. 1st and North 3d Streets, Williamsburgh, N. Y.



The Perfect Comb.

We call your attention specially to our new patent endless wire frame comb. The result of a long series of experiments, made with a view to meeting all the requirements of a *Perfect Comb*. It is better, stronger, and more durable than any ever before invented. The raised wire shank gives what has never before been attained, viz: a rest and brace for the thumb, in such a position that the hand cannot come in contact with the horse while using the comb. The wire braces which run from the shank over the back to the front teeth give strength and durability in a direction never heretofore attained, and at the same time serve as an extra handle; and when clasped by the fingers in connection with the raised shank the comb is more firmly, easily, and completely held, and with much less fatigue to the hand than is possible in any other formation—in short, it needs but a trial to vindicate its name: **The Perfect Comb.**

THE LAWRENCE COMB CO.

Factory and Office,

382 2d Ave., cor. 22d St., N. Y.

WILLIAMS WHITE & CHURCHILL

Successors to

MACKRELL & RICHARDSON MFG. COMPANY

Manufacturers of

Builders' Hardware,

Locks, Hinges, Hooks and Staples,
Awning Hooks, Meat Hooks, Pincers,
Champion Noiseless Pulleys,
CHAIN PULLEYS &c.

Factory, cor. Flushing and Nostrand Avenues BROOKLYN.

Warehouse, 73 Warren St., N. Y.

WM. S. CARR & CO.

Sole Manufacturers of

CARR'S

Patent Water Closets,

PUMPS,

Cabinet Wood Work, Vases, &c

106, 108 & 110 Centre Street,

Factory, Mott Haven, New York.

J. AUSTIN & CO.,

168 Fulton Street, N. Y.,

Proprietors and Manufacturers of

WHEATCROFT'S SELF-ADJUSTING

Pipe Wrench,

AND

Scripture's Funnel Top MACHINE OILERS.

Dealers in

STEAM AND GAS FITTERS TOOLS.

RIEHLE BROTHERS,

Ninth Street, near Coates, Philadelphia.
New York Store, 93 Liberty Street.
Pittsburgh Store, 285 Liberty Street

"Patented" Furnace Charging Scale.

Double Beam R. R. Track Scale, Compound Parallel Crane Beams, &c. Patented First Power Lever Wagon Scales. Testing Machines any capacity.

The Iron Age Directory

and index to Advertisements.

Wrought Iron Philosophically Considered.

Dr. Anderson, in his lecture on "Tools," lately delivered at Manchester, England, said:

When we think of any sort of material beyond the working treatment of their mechanical properties, we seem to be in another world. Take, for example, a piece of common wrought iron. It seems to us as of the earth earthy, but if we are closely questioned in regard to the reason for its various properties, we find that we scarcely know anything. Tracing it from the ore through its various stages until it is in the hands of the smith is comparatively easy. We know the natural law that governs its elasticity, the limit of its elasticity, its ultimate strength; that it can be welded; that it is ductile, and can be drawn out into a fine wire; that it is malleable, and can be spread out into a sheet, or worked round from the sheet into a goblet, and may be gathered back again, if by so doing it served any useful purpose; but when we think of the marvelous changes which have taken place amongst its molecules during the operation, we are lost in wonderland. To many minds the piece of cold iron seems to be a solid; under the pressure of the testing machine it is shown to be an unstable fluid. When the smith has the misfortune to leave a piece too long in the fire, it vanishes; it has found evil companions, and gone off under an assumed name and a new character. When a piece of iron is broken and carefully examined under a microscope, we can see that it is composed of fine crystals; but these crystals, we are told, are composed of innumerable molecules, which are not to be seen by the microscope, being smaller than the human mind can imagine; still, the smith feels himself under their influence. In homely words he speaks of the iron being "red-short" or "cold-short," without thinking that he is on the threshold of some of the impenetrable secrets of nature. The steel maker can take advantage of the molecular properties. With heat he can push them asunder and infuse amongst them the subtle vapor of carbon, and the iron becomes steel, highly improved in most of its mechanical properties, and with an increase of strength and elasticity. It may be inferred that each iron molecule is a little world in itself, surrounded with a thin wrapping of infinite space, no single molecule being in actual contact with any other molecule. We have reached the limit of sub-division, so far as the engineer dare venture. The investigating philosopher, however, ventures much further with his speculations; he tries vainly to penetrate into the supposed ultimate atoms of matter of which the molecules are composed, but further we need not follow. Suffice to say that a piece of common wrought iron is altogether a mystery, and teaches man the lesson of humility.

Canadian Manufactures of Iron.

The following statistics of Canadian manufactures of iron are compiled from the Dominion census of 1870–'71:

Industries.	Number of establish.	Hands employed.*	Yearly wages.	Value of raw ma terial.	Value of wrought product.
Agricultural implements	252	2,415	$ 856,084	$ 889,847	$2,685,398
Blacksmithing	6,775	9,813	2,217,222	1,529,406	5,264,461
Foundries & machine working	430	7,093	2,429,815	2,427,433	7,325,531
Tin & sheet iron working	798	2,102	508,460	1,183,561	2,892,638
Edge tool manufactures	44	265	145,154	134,205	418,775
Boiler making	15	224	66,125	187,900	363,150
Eng ne building	13	856	325,961	412,808	1,044,525
Gun making	29	42	15,422	6,711	34,877
Saw and file cutting	11	149	62,465	139,445	276,523
Bell foundries	8	17	6,500	13,398	28,100
Spike and railw'y chair factory	1	26	12,000	48,000	8 ,000
Cutlery	3	9	3,100	5,100	11,540
Spring and axle factories	7	147	51,000	97,800	238,812
Fittings & f'ndry work'g in brass, iron, lead, etc.	76	879	276,988	374,824	893,368
Skate factory	1	48	30,000	35,000	90,000
Iron smelti'g furnaces and steel making	6	609	125,000	62,100	298,000
Lead pipe works	1	25	5,500	98,0.0	117,317
Mathematical instrument mak'g	4	13	6,280	1,020	11,000
Nail and tack factories	15	495	191,870	708,580	1,147,380
Railway car factories	5	175	61,000	298,000	512,000
Rivet factory	1	13	4,000	7,000	25,000
Rolling mills	9	644	241,500	1,009,000	1,680,000
Scale factories	7	47	18,360	28,870	65,790
Sewing machine factories	18	795	375,845	367,449	1,123,464

* Over 16 years.

Copper Alloy that will Adhere to Glass.—The following alloy of copper will attach itself firmly to surfaces of metal, glass or porcelain: Twenty to thirty parts of finely blended copper (made by reduction of oxide of copper with hydrogen or precipitation from solution of its sulphate with zinc) are made into a paste with oil of vitriol. To this seventy parts of mercury are added and well triturated. The acid is then washed out with boiling water and the compound allowed to cool. In ten or twelve hours it becomes sufficiently hard to receive a brilliant polish and to scratch the surface of tin or gold. When heated it is plastic, but does not contract on cooling.

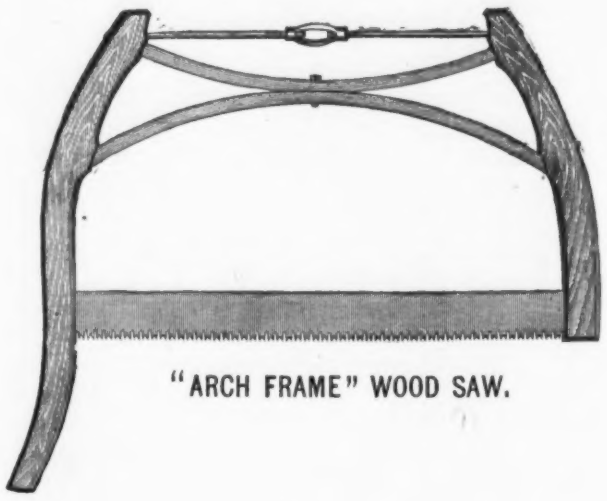
The Japanese government is taking steps for establishing blast furnaces, in which the excellent magnetic iron ores averaging above 50 per cent. metallic iron, and which occur in lodes, are to be smelted both with charcoal as well as coke. The iron hitherto manufactured in Japan has been made from the iron sands which occur in the islands of Yesso, by a sort of bloomery process, and these iron sands have lately been described in the report of Mr. B. S. Lyman, the geologist and mining engineer to the government of Japan, as consisting of two varieties, the one easily smelted and pure, whilst the other is difficult to smelt, and supposed to contain titanium. He estimates the total quantity of these sands at 125,000 tons, which he regards as containing 91,000 tons metallic iron, but states that only some 5500 tons of the sand are of the easily smelted description.

HENRY DISSTON & SONS,

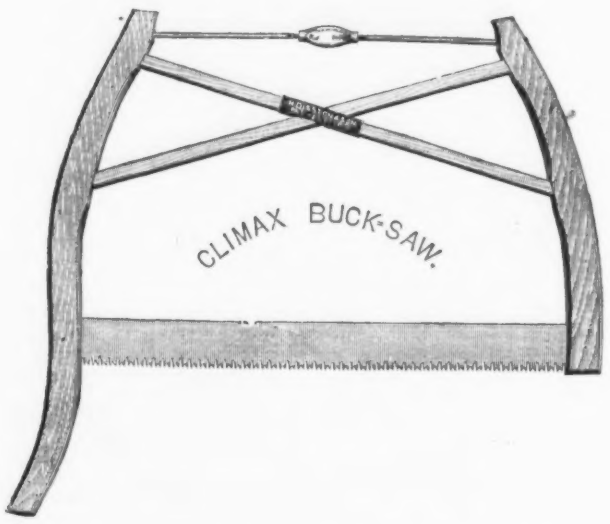
Keystone Saw, Tool, Steel and File Works.

Front and Laurel Streets, Philadelphia.

Branch Works, Tacony, Philadelphia. **Branch House, Randolph & Market Streets, Chicago, Ill.**

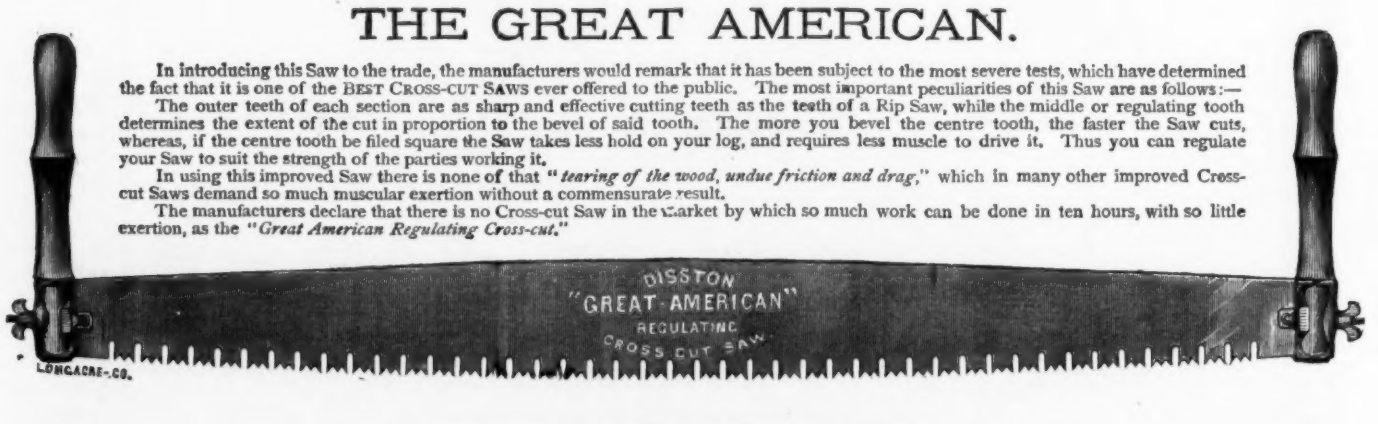


"ARCH FRAME" WOOD SAW.



DISSTON'S WOOD SAW FRAME.

THE GREAT AMERICAN.



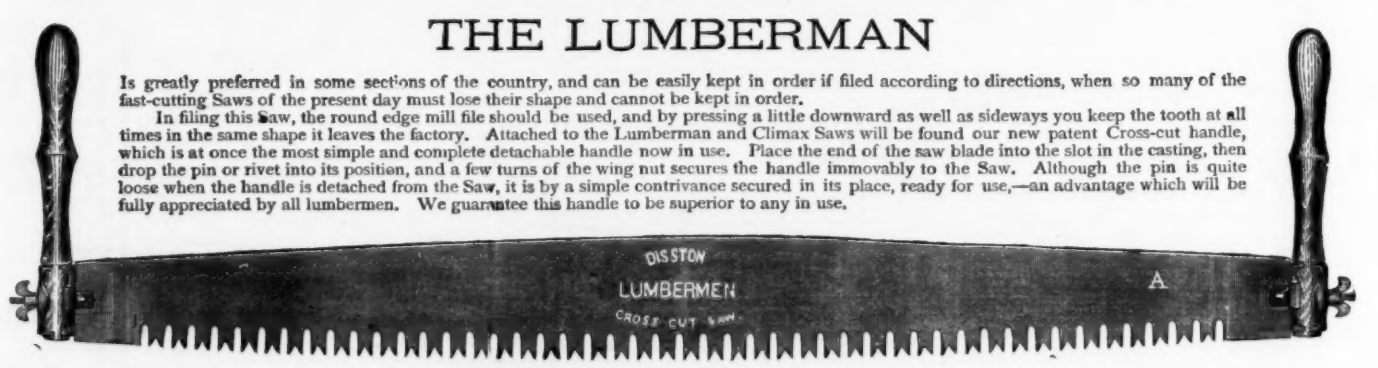
In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the BEST CROSS-CUT SAWS ever offered to the public. The most important peculiarities of this Saw are as follows:—

The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.

In using this improved Saw there is none of that "*tearing of the wood, undue friction and drag*," which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.

The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "*Great American Regulating Cross-cut.*"

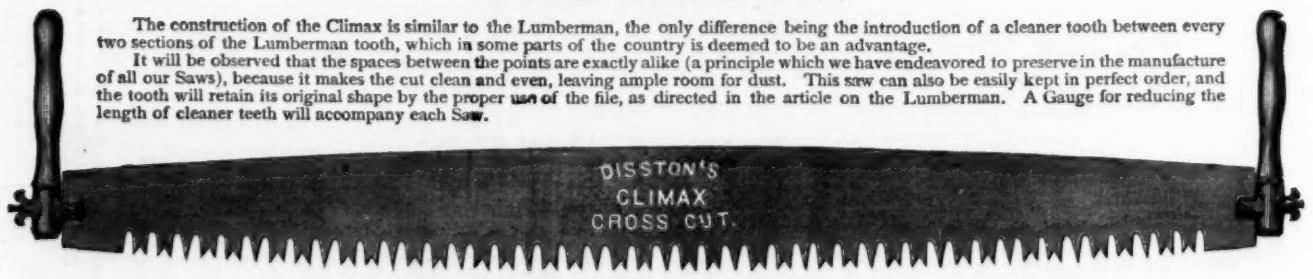
THE LUMBERMAN



Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.

In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.

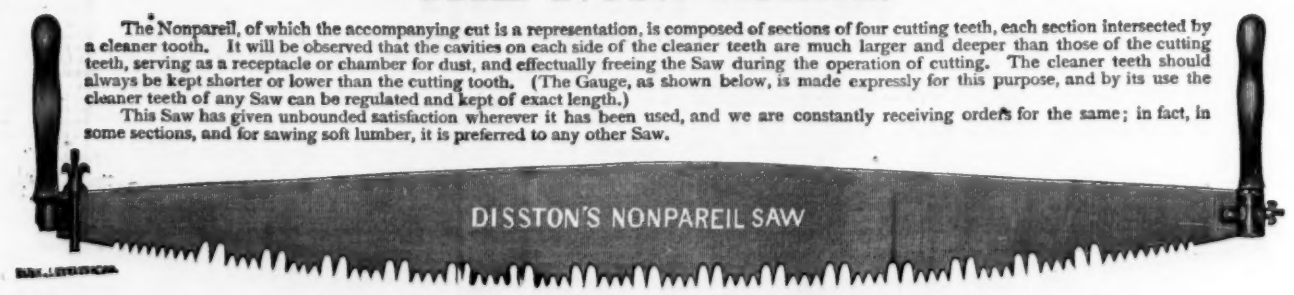
THE CLIMAX.



The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.

It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.

THE NONPAREIL.

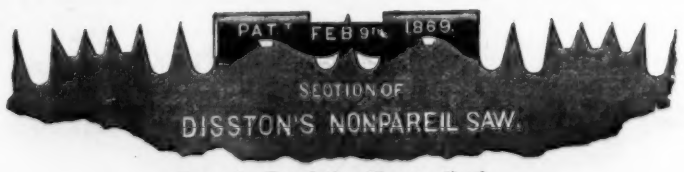


The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)

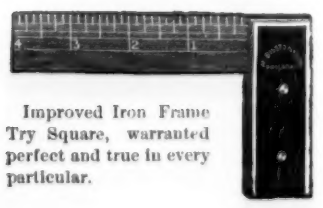
This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.

Our Celebrated CROSS-CUT SAWS.

Improved Pruning Saw and Knife, Patented August 29, 1873.



Gauge for Regulating Cleaning Teeth.



Improved Iron Frame Try Square, warranted perfect and true in every particular.

New York Wholesale Prices, June 23, 1875.

HARDWARE.

Anvils.
Solid Cast Steel....₩ ℔ 14c
Wright's....₩ ℔ gold 11c; over 250 ℔s 11¼c, gold
Armitage's Mouse Hole....gold 11c
Wilkinson's....₩ ℔ gold 11c
Eagle Anvils....₩ ℔ 8c

Apple Parers.
Domestic, Turn Table, Lightning, Hudson's, Reading, Union....$7.75 ₩ doz
Skeleton Paring, Coring and Slicing....$8 00 ₩ doz net
Bay State, Paring, Coring and Slicing....$15 00 dis 10 %
Climax Slicer....8 00

Augers and Bits.
Douglass, Ives, Beecher (French, Swift & Co), Griswold, Challenge....1st quality....dis 40&10 %
Nobles Mfg. Co....dis 40 @ 40&5 %
Cook's....d's 40&10&10 %
Snell Mfg. Co....dis 22½ @ 25 %
Jennings' Bits....dis 10 %
Lewis' Single Twist Bits....dis 30 %
Andrews' Bits....dis 25 %
Griswold's Patent Bits....dis 20 %
Expansive Bits, Clark'....small, $18; large, $26—dis 15 %
" " Ives'....$20 @ $30—dis 30 %
" " Blake's....$30—dis 40 %
Hollow Augers, Douglass', Ives', French, Swift & Co....dis 40 %
" " Bonney's Adjustable, ₩ doz $48—dis 25 %
" " Stearns'....₩ doz $48—dis 25 %
" " Ives' Expansive....each $4·50—dis 40 %
" " Universal Expansive, each $4·50—dis 10 %
Gimlet Bits—Screw, $7·50; no screw, $9....dis 20&10 %
Double Cut Gimlet Bits, Shepardson's....dis 20 %
" " Hartwell's....dis 50 %
" " Douglass'....dis 20&10 %
" " Ives'....dis 30 %
Morse's Bit Stock Drills....dis 20 %
L'Hommedieu's Ship Augers....dis 15 @ 20 %
Watrous Ship Augers....dis 15 %
Vaughan's Post Hole—6 in. $23 60; 7, 8 and 9 in. $25 per doz....dis 20 %

Awls, Brad Sets, &c.
Awls, Sewing....per gross $1·20—dis 10 %
" Shouldered Peg....per gross 2·25—dis 10 %
" Patent Peg....per gross ·60—dis 10 %
" Shouldered Brad....per gross 2·25—dis 10 %
Brad Sets, Aiken's....dis 25 %
" Nos. 42 and 43....dis 35&10 %
" Clark's....dis 30&10 %
" Stanley's Excelsior....$18 50—dis 25&10 %

Axes.
Brook's....per doz $12 00 @ 14 00 net
Blood's....per doz $15 00 @ 16 50—dis 20 %
Hunt's....₩ doz $12 50 @ 14 00
Collins'....₩ doz 11 00 @ 15 50 net @ dis 5 %
H. Clark's (J. C. W. & Co.) bron'd or red, ₩ doz $10 00 net
Hurd's....₩ doz 10 50 @ 12 50
Simmons'....₩ doz 11 00 @ 11 50
Morris'....₩ doz 12 50 @ 13 50
Red Jacket....₩ doz 12 00 @ 12 50
Mann's....₩ doz 11 50 @ 13 00
" Double Bitted....₩ doz 21 50 @ 22 00
Underhill's....₩ doz 12 00 @ 13 00
" Crown....₩ doz 12 50 @ 13 50
John Leverett's....₩ doz 12 50 @ 15 50
Ten Eyck....₩ doz $10 50 @ 12 50 net
M. H. Jones & Co....₩ doz 10 50 @ 12 50 net
Nobles Mfg. Co....per doz $10 50, net

Balances....dis 35 %

Bands.
Plated....new list dis 50&5 %
Iron Rim....new list dis 25&5 %
Brass (Plated list)....new list dis 50, 10&5 %
Oroide....new list dis 50&5 %

Bells.
Hand, Light Brass....dis 70&5 @ 70&10 %
" Extra Heavy....dis 40&10 %
" White Metal....dis 50&10 %
" Silver Chime....dis 15&10 %
" Swiss....dis 25 %
" Globe (Cone's Patent)....dis 15&10 %
Gong Abbe's....dis 15&10 %
" Yankee....dis 30&10 %
" Barton's....dis 33⅓ %
Crank, Taylor's....dis 25 %
" Brook's....dis 60 %
" Cone's....dis 10 %
" Connel's....dis 50&10 %
Lever, Sargent's....dis 60&10&10 %
" Taylor's....dis 25 %
" Hart, Bliven & Mead Mfg. Co....dis 50&10 %
Pull, " " " "....dis 50&10 %
" Brook's....dis 50 %
" Western....dis 25 %
Cow—Common Wrought....dis 20&10 %
" Western....dis 20&10 %
" " Sargent's....dis 50&10&10 %
" Kentucky "Star"....dis 20&10 %
" " Sargent's....dis 50&10&10 %
" Dodge's Genuine Kentucky, new list—

Nos.	0	1	1½	2	3	4	5	6	Hog.	
	$12·00	10·00	9·00	8·00	6·00	5·00	3·50	2·50	5·00	dis 45 %

" Yaw's Genuine....dis 30 %
" Texas....dis 35 %
Call....dis 15 %

Bellows.
Blacksmiths'....dis 20 %
Moulders'....dis 20 %
Hand Bellows....dis 10 %

Blind Adjusters.—Domestic....₩ doz $3—dis 20 %

Blind Fasteners.
Mackrell's....dis 30 %
Van Sand's, No. 2000, $14·00; No. 8705, $10·50....net
Washburn's Patent....₩ gross $14 00 net
Merriman's....new list net

Blind Staples.
Boardman's Patent, ⅜ in. and larger....₩ ℔ 37 c
" ¼ in....₩ ℔ 42 c

Blocks.
Tackle, Rope and Iron Strapped, Providence Tool Co.'s list....dis 30 %
Burr's....dis 10 %
Stanley Rule and Level Co....dis 25&10 %

Bolts.
Cast Iron Barrel, Shutter, &c....dis 60&10 %
Cast Iron Chain....dis 60&10&10 %
Wrought Iron Barrel....dis 50, 10&10 %
" " Square....dis 50, 10&10 %
" " Shutter....dis 60&10 %
Wrought Iron Flush, Stanley's....dis 15&10 %
" " Sargent's....dis 50&10&10 %
Carriage and Tire, Common....dis 75 %
" " " Norway Iron....dis 50&10 %
" " " R. B. & W....(old list) dis 60 %
" " " Philadelphia, Star....dis 55 %
" " " " Eagle....dis 55 %
Union Nut Company, old list....dis 60&10 %
Stove....dis 25 %
" R. B. & W....dis 25 %

Borax....15c. ₩ ℔

Boring Machines.
Kellogg's....dis 15 %
Snell Mfg. Co., Rice's Patent....dis 20 %
" " Regular....dis 20 %
Douglas Mfg. Co....No. 5, $3·25; with Augers, $5·00 net
No. 2, 4·00 " " 6 00 net
Parr's....dis 30&10 %
Phillips' Angular, complete with Augers....each $7 25
Mortising Machines, $20·00 each....dis 20 %

Bow Pins.
Union Nut Co....new list dis 50&10&5 %
Hotchkiss'....dis 50 @ 55 %
Humason, Beckley & Co.'s....dis 50&10&5 %
Sargent & Co.'s....dis 50&10&10 %

Braces.
Barber's Patent....dis 40&5 %
Q. S. Backus....dis 40&10 %
Wilson Mfg. Co....dis 10 %
Spofford's Patent....dis 50 %
Noble's Patent....dis 40&5 %
Ives' Novelty....dis 40&7½&10 %
" Hamden....dis 45&10 %
Common Ball....dis 15&10 %

Brackets.—Shelf....dis 60&10 @ 65&10 %
Bright Wire Goods....dis 65&10&10 %
Bull Rings.—Union Nut Co., new list, dis 50&10&5 %
Sargent's....dis 60&10 %
Hotchkiss'....2½ in., $2·25 net

Bung Hole Borers.
Common and Ring....dis 20&10 %
Ives' Two Borers....dis 10&10 @ 25 %
Enterprise Mfg. Co....dis 20 %

Butchers' Cleavers.
Humason & Beckley Mfg. Co....dis 20&10 %
Bradley's....dis 25 %
Beatty's....dis 20 %

2	3	4	5	6	7	8	9
$19·00	$21·50	$24·00	$27·00	$30·00	$33·50	$36·50	$40·00

Hart Mfg. Co....dis 45&10 %

0	1	2	3	4	5	6
$25·25	$29·75	$34·25	$38·75	$43·25	$48·50	$54·00

Butts.
Wrought Brass....dis 30 %
Cast Brass....dis 20 %
Common Cast, not Drilled.
Fast Joint, Narrow....new list, dis 30&10 %
" Broad....dis 40&10 %
" " Jap'd....dis 35&10 %
Loose Joint, Narrow and Broad....dis 50&10 %
" " Jap'd....dis 45&10 %
Parliament Butts and Mayer's Hinges....dis 40&10 %
Loose Pin, all kinds....dis 45&10 %
Drilled and Wired.
Fast Joint, Narrow....new list, dis 25&10 %
" Broad....dis 35&10 %
" " Jap'd....dis 30&10 %
" " with Acorns....dis 30&10 %
Loose Joint....dis 45&10 %
" Jap'd....dis 25&10 %
" with Acorns....dis 40&10 %
Parliament and Mayer's Hinges....dis 35&10 %
Loose Pin, all kinds....dis 40&10 %
Wrought Iron.
Fast Joint, Narrow, Lt. and Regular....dis 30 %
" Broad....dis 35 %
Loose Joint, Narrow and Broad....dis 35 %
Table Butts, Back Flaps, &c....dis 30 %
Inside Blind, Regular....dis 30 %
" Light....dis 40 %
Loose Pin, Wrt....dis 35 %

Am. Spiral Spring Butt Co., list May 1st....dis 20 %
Union Spring....dis 20 %
Blind Butts, Parker....dis 60 @ 60&10 %
" Palmer....dis 40 %
" Seymour....dis 55&10 %
" Shepard....dis 60 @ 60&10 %
" Lull & Porter....dis 60 %
" Nicholson....dis 45&10 %
" Huffer....dis 33⅓&10 %
" Garretson, No. 1....dis 60 @ 60&10 %
" Clark's Nos. 1, 3 and 5....dis 60 @ 60&10 %
" Clark's No. 30....dis 60&10 @ 65&10 %
" " Nos. 2, 4, 4½, 6, 8, 10....dis 40 %

Caps—Percussion, per 1000.
G. D....37 @ 40c
Ely's E. B....1-4s, 58c.; 1-10s, 70c. gold
" Double Waterproof, 1-4s, $1·45; 1-10s, $1·52½c., gold
Colt's....1-10s 80c gold

Carpet Sweepers.
Union....each $2 75 net
Welcome....each 2 75 net

Cartridges.—Metallic....dis 50&10 %
Cards.—Horse and Curry....dis 30&10 %
Cotton....dis 10&10 %
Wool....dis 15&10 %

Carpet Stretchers.
P. S. & W....per doz $2 00; dis 40&5 %
Sargent's....per doz $2·88—dis 50&10&10 %

Casters.
Bed....dis 30&10 @ 40 %
Plate and Shallow Socket....dis 40&10 %
Deep Socket....dis 33⅓ %

Cattle Leaders....new list dis 60&10 %

Chain.
English Coil....net gold

₩ ℔	11½	8¾	8¼	7¾	7½	7¼c
	3-16	¼	5-16	⅜	7-16	½

Trace, 6½-10-2....by the cask, ₩ pair, gold 55c
Trace, 7-10-2....by the cask, ₩ pair, gold, 62c
German Halter Chain....dis 20 % gold
German Coil....dis 20 % gold
Galvanized Pump Chain....₩ ℔ 13c
Jack Chain, Iron....dis 50&10 %
" Brass....dis 40&10 %

Chalk.
White....₩ gross, 57c net
Red....₩ gross, 90c net
Blue....₩ gross, $1·00 net
White Crayons....₩ gross, 16½c net

Chisels.
Socket Framing, Douglass, Extra....dis 60&10&10 %
" " Crossman....dis 50&15&10 %
" " Buck Bros....equivalent to dis 50&15 %
" " Hart Mfg. Co....dis 60&10 %
" " Merrill....dis 60&10 %
" Firmers, Douglass, Extra....dis 60&10 %
" " Crossman....dis 50&10&10 %
" " Buck Bros....equivalent to dis 50&15 %
" " Hart Mfg. Co....dis 60&5 %
" " Merrill....dis 60 %
Socket Corner....dis 60&10 %
Tanged Firmers....dis 40&10 @ 50 %
Butcher's....$5·50 to £ gold
Newbould's....$5·50 to £ gold
Spear & Jackson's....$5·50 to £ gold
Buck Bros (Shank)....$5·50 to £ gold

Clamps.
Cabinet....dis 60&10 %
Gray's....dis 20 %
Lambert's....dis 20 %
Providence Tool Co....dis 10 %

Clips, Axle.
Norway or Best....dis 40 %
Superior....dis 50 %
"Star," Superior Philadelphia....dis 45&5 %

Coal Shovels.
Edgar's Pat. "Gem," Short and Long H'dled....dis 15 %
Iron Handled....₩ doz, $ 85 @ 1 25
Wooden Handled....₩ doz, 1 00 @ 2 00

Coal Hods.—Smith, Burns & Co....dis 15 @ 25 %

	14	15	16	17	18 inch.
Japanned	$6·00	6·35	6·75	7·50	8·00 per doz.
Galvanized	9·50	10·00	10·75	11·50	12·50 "

Morning Glory Funnel Hods—

No.	15	16	17
Japanned	$9·00	10·50	12·00 per doz
Galvanized	13·00	14·50	16·00 "

Sidney Shepard & Co.'s new list....dis 19 %

Cockeyes....1¼ in., 28c.; 1½ in., 33c.; 1¾ in., 37c. net

Cocks.
Brass Racking....dis 33⅓ %
Lock and Globe....dis 33⅓ %
Lever Bibbs....dis 33⅓ %
Ale and Beer....dis 20&10 @ 25&10 %

Coffee Mills.
Board and Box....dis 15 @ 20 %
Increase Wilson's....dis 20 %
Selsor's Pat....$9·50, $10·50—dis 25 %
American (Enterprise Mfg. Co.)....dis 20 %
French Steel....dis 15 %
The Swift....dis 26 %

Compasses and Dividers.
Bemis & Call Co.'s....dis 35&10 %
Cook's....dis 15 %
Excelsior....dis 30 %
Peck Stow & Wilcox....dis 25 %
Miller's Patent....dis 25 %

Coopers' Tools.
Bradley's....dis 15 @ 20 %
Chas. E. Little....dis 20 @ 25 %
Swan & Brombacher....dis 15 @ 20 %

Corkscrews....dis 23 %

Corn Knives and Cutters.
Bradley's....dis 10 %

Crow Bars.
Cast Steel....₩ ℔ 11c. net
Iron, steel points....₩ ℔ 6c

Crucibles.—Gautier & Co....₩ No. 5½c

Curling Irons, &c.
⅜, ⅝, ¾ in., $1·80, $2·00, $2·40....dis 10 %
Curling Tongs....₩ doz $6 50—dis 15 %
Pinching Irons....₩ doz 7 50—dis 20 %

Curry Combs.
Hotchkiss' & Kellogg's, Iron & Brass, old list, dis 30&10 %
Fitch's (List of No. 240, $1)....dis 20&10 %
Rubber....₩ doz, $9·00—dis 15 %

Curtain Pins.—Silvered Glass....old list dis 52½ %

Cutlery.
American Table { Meriden } New list Jan. '75, dis 25 %
American Pocket { Cutlery Co } dis 25 %
Am. Pocket—Humason & Beckley Mfg. Co....dis 20&10 %

Dippers.
Britannia....per doz 7·50—dis 30 %; by bbl. dis 33⅓ %
Cocoa, Plain....per doz $3·25—dis 20 %
" Rimmed....per doz 3·75—dis 20 %

Dog Collars.
Embossed Gilt....dis 20 %
Leather....dis 20 %
Brass....dis 25 %

Door Springs.
Gray's....$7·50 ₩ doz—dis 50&10 %
Torrey's Patent....$7·50 ₩ doz—dis 55 @ 55&10 %
Johnson's....per doz $3 00 @ 4 00
Palmer's Japanned No. 6....₩ doz $5·00 } dis 20 %
" Coppered " ....6·00
" Silvered " ....8·00
Challenge.—
Japanned....No. 9, per doz $4·00 } dis 40 %
No. 7, " 5·00
No. 6, " 6·00
Gem.—No. 1 large, Japanned....per doz $4·00 } dis 10 %
No. 2 medium....per doz 3·50
No. 3 small....per doz 3·00
Barker's Concealed....dis 12½ %

Drawing Knives.
Crossman's No. 1....dis 50&15&10 %
Douglass, Extra....dis 60&10&10 %
Hart Mfg. Co., No. 1....dis 60 %
Merrill....dis 60&10 %
Nobles Mfg. Co....dis 15 %
Bradley's....dis 25 %
Adjustable Handle....dis 15 %

Drills and Drill Stocks.
Blacksmiths'....each $2 60 net
" Self-Feeding....each $8 00 net
Breast, P. S. & W....dis 25 %
" Miller's Falls....dis 25 %
" Aiken's....dis 40 %
" Hotchkiss'....dis 10 %
" Wilson's....dis 10 %
Ratchet, Merrill's....dis 20 %
" Ingersoll's....dis 35 %
" Whitney's....dis 20 %
" Weston's....dis 20 %
" Moore's Triple Action....dis 20 @ 25 %
Wilson's Drill Stocks....dis 10 %
Automatic Boring Tools....each $2·75—dis 20 %

Drill Chucks.—The Danbury..each 10·00, dis 20 @ 25 %
Beach Patent (Morse)....dis 15 %

Egg Beaters.
Monroe's....8 in. 10 in.
Per doz $8·00 9·00....dis 10 %
Dover....₩ doz $6·00—dis 10 %
National....₩ doz $4·50—dis 20 %
Peerless....₩ doz $4·00—dis 10 %

Emery.
Genuine Chester—Regular Nos....₩ ℔ 6c } dis 10 %
" Flour and FF....₩ ℔ 4c
Washington Mills—Regular Nos....₩ ℔ 8c
" Flour....₩ ℔ 5c

Enameled and Tinned Ware.
Kettles....dis 30 @ 40 %
Sauce Pans....dis 25 %
Glue Kettles....dis 20 @ 25 %
Tinned Saucepans....dis 25 %

Escutcheons.
Door Lock....Same discounts as Door Locks
Brass Thread....dis 60&10 %
Wood....dis 25 %

Faucets.
Fenn's....dis 50 %
" Cork Stops....dis 40 %
Star....dis 55&10 %
Frary's Patent Petroleum....dis 15&10 %
Taylor's Pattern "....dis 20&10 %
Wood and Metallic....dis 40 %
Wood, Cork Lined....dis 60&10 %
Enterprise Mfg. Co., Self-Measuring....dis 20 %

Felloe Plates....₩ ℔ 15c; dis 25 %

Files.
American File Co....$5 00 to £ currency—dis 15 @ 20 %
Auburn File Co....$5 00 to £ currency
Nicholson....new list, Jan. 1, 1875, net
Hartford File Co....$5 50 to £ currency—dis 10 %
L. B. Heller & Co....$5 00 to £ currency
Heller & Bros....$5 00 to £ currency
"Western"....5 00 to £ net
Rothery's....$5 to £ currency
Black Diamond....$5 to £ currency, dis 10 %
J. & Riley Carr....5 25 to £ gold
" Horse Rasps....5 50 to £ gold
Stubs'....$ 50 @ 9 00 to £ gold
Butcher's....5 25 to £ gold
Walter Spencer & Co.'s "Diamond"....5 00 to £ gold
Spear & Jackson's....5 00 to £ gold
Jowitt's....5 00 to £ gold
Newbould's....5 25 to £ gold
W. K. & C. Peace's "Imperial"....5 25 to £ gold
R. Ibbotson....5 00 to £ gold
Turton Bros. & Matthews....$5 50 to £ currency
Ashworth's (Van Wart & McCoy)..$5 00 to £ cur. dis 10 %
Fisher's....4 75 to £ gold
Goodlad's....4 00 to £ gold
Moss & Gamble....5 25 @ 5 50 to £ gold
Thos. Turner & Co. (Peter A. Frasse & Co.) 5 00 to £ gold
" Horse Rasps....5 25 to £ gold
"Philo Sheffield," P. T. Co....5 00 to £ gold
Limet & Co. (French)....5 00 to £ gold

Fluting Machines.
Mrs. Coles' Pony..4 in., $4·75; 5 in., $5; 6 in., 5·50; 7 in., $6
Knox, with 4-inch Rolls....4 15 each net
" " 6 "....4 50 each net
" " 8 "....6 75 each net
O. K....6 50 each net
Peerless, 4-inch Rolls....4 00 each net
" 5 "....4 75 each net
Excelsior, No. 1....4 75 each net
" No. 2....6 50 each net
Diamond....7 50 each net
Champion, 6 inch rolls....$6 00 each net
" 4 inch rolls....$5 00 each net
Climax 7-inch Rolls....8 00 each net
" 4½ "....6 50 each net
Empire....4 00 each net
Eureka, No. 1, 7-inch Roll....8 00 each net
" No. 2, 5-inch Roll....6 00 each net
K. F. M., 4½-inch Roll....5 50 each dis 15 %
" 6-inch Roll....6 00 each dis 15 %
Myers' Fashion Fluter, 4½-inch Rolls....3 75 each net
" Convex Brass Fluter, Sad Iron attachment..$1·75
Domestic Fluter....$1·50 each net
Fairy, Self-Heater....00 each net
Geneva Hand Fluter....$15 00 per doz net

Fluting Scissors....dis 25&10 %

Forges.
Empire" (W. P. Kellogg & Co.)....dis 30 %

Forks.
Hay, Manure & Spading....dis 33⅓ %
Plated A 1....dis 50 %

Fry Pans.
Burnished, P. S. & W., new list....dis 45 %

₩ doz	$3·00	3·75	4·25	4·75	5·25	6·00	7·00	8·00	9·00
No.	0	1	2	3	4	5	6	7	8

Smith, Burns & Co., "Excelsior" Polished....dis 35 %

₩ doz	$3·70	4·00	4·70	5·30	6·00	7·00	8·00	9·00
No.	1	2	3	5	6	7	8	

Gas Stoves.
Tifft & Howard....dis 20 %

Gauges.
Marking....dis 45&10 %
Wire....dis 10 %
" Smith's Patent....per doz $18·00, dis 40 %

Gimlets.
Nail and Spike....dis 25&10 %
Double Cut, Shepardson's....dis 20 %
" " Ives'....dis 25 %
" " Douglass'....dis 20&10 %

Grind Stone Fixtures
Sargent's Patent....dis 65&10 %
Reading Hardware Co....dis 70&10 %
J. F. Green & Bro....dis 30 %
Hart Mfg. Co.'s....dis 60&5&10 %

Hammers.
Emmet Hammer Co.'s Handled....dis 25 %
" " Sledge & Stone..₩ ℔ 25 @ 30c net
Humason & Beckley Mfg. Co....dis 16⅔&10 %
Maydole's, new list....dis 5 @ 7 %
Cheney's....net
Verree....dis 5 %
Yerks & Plumb....dis 12½ %
Magnetic Tack....dis 25&10 %
Warner & Noble's....dis 10 %

Hand Cuffs and Leg Irons.
Tower's Hand Cuffs, $4 00 per pair } dis 25 %
" Leg Irons $6 50 per pair
Providence Tool Co.'s Hand Cuffs..$15 per doz } dis 10 %
" " Leg Irons .. 25 "

Handles.
Door or Thumb Latches—

Nos.	0	1	2	3	4
Per doz	$0·80	1·00	1·18	1·35	1·50—dis 60 %

Roggin's Latches....40c. @ 50c. net
Bronzed Iron Drop Latches....per doz $1·30 net
Wrought Chest....dis 60&10 %
Surface Chest....dis 65&10&10 %
Flush Chest....dis 60&10&10 %
Lifting....dis 60&10 %
Coffin....dis 50&10 @ 60&10 %
Saw and Plane....dis 20&10 %
Hammer and Hatchet....dis 10 %
Brad Awl....per gross $3 50—dis 20&10 %
Hickory Firmer Chisel, ass'td....5 25—dis 20&10 %
" " " large....6 50—dis 20&10 %
Apple " " ass'td....6 00—dis 20&10 %
" " " large....7 50—dis 20&10 %
Socket " " ass'td....3 50—dis 20&10 %
" Framing " "....7 00—dis 20&10 %
File....4 00—dis 20&10 %
Auger....6 50—dis 20&10 %
" large....8 00—dis 20&10 %
Patent Auger, Ives'....dis 25&10 %
" " Douglass'....per set $1 45—dis 10 %
" " Swan's....per set $1 00—dis 10&10 %

Hangers.
Barn Door....dis 65&10 %
"Anti-Friction" (Rider, Wooster & Co.)....dis 30&5 %
Novelty....dis 30 %

Harness Snaps.
Henshaw's....dis 25&10 %
Judd's....dis 40 %
Fitch's (Bristol)....dis 30 %
Hotchkiss'....dis 10 %
Andrews'....dis 25 %
Sargent's....dis 50&10 %
New York Wire....dis 20&20 %

Hatchets.—Isaiah Blood....dis 15 %
Shingling, Nos. 1 2 3....₩ doz $7 25 8 00 8 75
Claw, " 1 2 3....₩ doz 7 75 8 50 9 25
Lathing, " 1 2 3....₩ doz 7 50 8 00 8 50
Hunt's....dis 10 %
Shingling, Nos. 1 2 3....₩ doz $7 25 8 00 8 75
Claw, " 1 2 3....₩ doz 7 75 8 50 9 25
Lathing, " 1 2 3....₩ doz 7 50 8 25 9 00
Hurd's....dis 25 %
Shingling, Nos. 1 2 3....₩ doz $8 00 8 50 9 00
Claw, " 1 2 3....₩ doz 9 00 9 50 10 00
Lathing, " 1 2 3....₩ doz 8 00 8 50 9 00
Newark's Edge Tool Co.'s....dis 25 %
Shingling, Nos. 1 2 3....₩ doz $6 50 7 00 7 50
Claw, " 1 2 3....₩ doz 7 25 7 75 8 25
Lathing, " 1 2 3....₩ doz 6 50 7 00 7 50
Yerkes & Plumb....dis 15 %
Shingling, Nos. 1 2 3....₩ doz $7 00 7 50 8 00
Claw, " 1 2 3....₩ doz 7 50 8 00 8 50
Lathing, " 1 2 3....₩ doz 7 00 7 50 8 00
Simmon's....dis 15 %
Shingling, Nos. 0 1 2 3....₩ doz $7 50 8 00 8 50 9 00
Claw, " 1 2 3....₩ doz 9 00 9 50 10 00
Lathing, " 1 2 3....₩ doz 8 00 8 50 9 00
Broad, " 1 2 3....₩ doz 9 00 10 00 12 00
" " 4 5 6....₩ doz 14 00 16 00 18 00
" " 7 8....₩ doz 20 00 22 00
Elephant....dis 25 %
Shingling, Nos. 1 2 3....₩ doz $8 00 8 50 9 00
Claw, " 1 2 3....₩ doz 9 00 9 50 10 00
Lathing, " 1 2 3....₩ doz 8 00 8 50 9 00
J. P. Verree & Co....dis 5 %
Shingling, Nos. 1 2 3....₩ doz $7 00 7 50 8 00
Claw, " 1 2 3....₩ doz 7 50 8 00 8 50
Lathing, " 1 2 3....₩ doz 7 00 7 50 8 00
Underhill's....dis 10 %
Shingling, Nos. 1 2 3....₩ doz 7 25 8 00 8 75
Claw, " 1 2 3....₩ doz 7 75 8 50 9 25
Lathing, " 1 2 3....₩ doz 12 00 11 00 13 00
M. H. Jones & Co....dis 25 %
Shingling, Nos. 1 2 3....₩ doz $8 00 8 50 9 00
Claw, " 1 2 3....₩ doz 9 00 9 50 10 00
Lathing, " 1 2 4....₩ doz 8 00 8 50 9 00

Hinges.
Gate, Western....₩ doz $6·25—dis 60&10 %
" N. E....₩ doz 11·25—dis 60&10&10 %
" N. Y. State....₩ doz 7·20—dis 60&10 %
Rolled Plate....dis 65&10 %
" Raised....dis 65&10 %
Wrought Strap and T....dis 33⅓&10 %
Providence Plate. { 6 and 8 in. 11c ₩ ℔ / over 8 in. 9½c ₩ ℔ } ....dis 30 %
Screw Hook and Strap....{ 8, 10, 12 in. 7c / 14 to 36 in. 6c }....net
Heavy Welded Hook....{ 8 to 12 in., 6½c / 14 in. & up, 6c }....net
Screw Hook and Eye....{ ⅝ to 1 in., 8½ / ½ in. 9½ / ⅜ in. 11½ }....net

Hoes.
Solid Shank, C. S....₩ doz $8 00—dis 35 %
Socket....₩ doz 9 00—dis 35 %
Riveted Eye....₩ doz 5 00—dis 35 %
Grub....dis 25 %
Planters....net @ dis 5 %
Scovill....add 33⅓ %
Scovill Pattern....net @ dis 5 %
Lane's C. S. Cresent, American Pattern....list net
" " " Scovil Pattern....add 10 %

Hooks.
Bird Cage....dis 60&10 @ 70&10 %
Cotton....dis 50 %
Belt....dis 55 @ 60 %
Bench—Hotchkiss' $5 00 ₩ doz....
" Weston's No. 1, $6·00; No. 2, $7·00 per doz net
" McGill's....$3 00 per doz, dis 10 %
" Skinner's....per doz $6·25, dis 20 %
Clothes Line, Harness, Wardrobe, Hat and Coat, Ceiling } Hart's list....dis 60&10&10 %; Sargent's list....dis 60&5&10 %; Reading list....dis 35&10 %
Wrought Staples and Hooks and Staples....dis 70&10 %
Wire Screw Hooks and Eyes....dis 65&10&10 %
Grass....dis 20 %
Whiffletree—Patent....dis 30 %
Hooks and Eyes—Malleable Iron....dis 60&10&10 %
" Brass....dis 60&10&10 %

Horse Nails.

	Nos.	5	6	7	8	9	10
American Pressed	₩ ℔	32c	30c	30c	30c	30c	30c
Ausable	"	30c	27c	25c	24c	23c	22c
" P't'd & Pol'd	"	31c	28c	26c	25c	24c	23c
" " & Blued	"	32c	29c	27c	26c	25c	24c
Brundage	"	29c	26c	24c	23c	22c	21c
Buffalo Forged	"	31c	28c	26c	25c	24c	23c
Globe, P't'd & Pol'd	"	31c	28c	26c	25c	24c	23c
National, Pointed and Polished, Pat. Fin	"	28c	25c	23c	22c	21c	20c
National, Pointed and Polished, Ex. Fin	"	30c	27c	25c	24c	23c	22c
New London U. B			29c	27c	26c	25c	24c
" " Great Western			27c	25c	24c	23c	22c
Perkins' Finished	"	30c	27c	25c	24c	23c	21c
Putnam	"	32c	28c	26c	25c	24c	23c
Vulcan, P't'd & Blued	"	33c	30c	28c	27c	26c	25c

Star Brand, 16c.; Morgan....14c
Putnam....2000 lbs., dis 5 %
Ausable, Am. Pressed, Perkins, Globe, National and New London....1000 lbs., dis 5 %
Vulcan....1000 lbs., dis 7½ %
Vulcan and Brundage....500 lbs., dis 5 %

Horse Shoes.
Burden....₩ keg, $4·87½
R. I. Horse Shoe Co., Perkins Pattern....₩ keg, 4·87½
" " R. I. Pattern....₩ keg, 5·87½
Mule Shoes....₩ keg, 5·87½

Kettles.
Brass....₩ ℔ 45c net
Enameled....dis 30 @ 40 %

Knives.
Ames' Butcher Knives....dis 20 %
" Shoe "....dis 15 %
" Bread "....₩ doz $1·50—dis 15 %
Hay and Straw, "Wadsworth's"....dis 20 %
Table and Pocket....See Cutlery

Knobs.
Carriage (Jap'd 80 cents per gross)....dis 60&10 %
Base—Common....net
" Plush Tip....dis 10 %
" Elastic End, No. 8....dis 30&10 %
Door, Mineral....₩ doz $2·25 } dis 45&5&2 %
" Por. Jap'd....₩ doz 3·00
" " Plated....₩ doz 7·00
" " Por....₩ doz 7·50
Furniture, Plain....75c gross inch, dis 10 %

Ladles.
Melting, Hart's....dis 55&10 %
" Sargent's....dis 50&10 %
" Reading....dis 15&10 %

Lanterns.
Tubular....No. 0, $11·00; No. 1, $14·00 net
Peerless....No. 5, per doz $11·75—dis 10&10 %
Brady's Patent....dis 10 & 10 %
Ætna....dis 10 & 10 %
Yankee....dis 10 & 10 %
De Beque....dis 10 & 10 %

Lard Presses.
Draw Cut, 14 inch....each $65 00—dis 20 %

Lemon Squeezers.
Porcelain Lined....per doz $7 00, dis 15 %
Eureka, Tinned....per doz, $10·00 dis 10 %
Dunlap's Improved....per doz $6·00 net

Lines.
Linen Fish....dis 20 %
Cotton Chalk....dis 40 @ 45 %
Sil. Lake Chalk....Nos. 0, 1, 2, 3, $6, 6·50, 7, 7·50, dis 20 %
Mason's....dis 20 %

Locks and Latches.
Cabinet—Gaylord....dis 25 %
" Eagle....dis 25 %
Trunk....new list dis 25 %
Langstroth & Crane, Round Key....dis 40 %
" " Flat Key....dis 33⅓ %
Barnes & Deitz....dis 25 %
Continental....dis 15 %
Shepardson's....dis 20 %
American Lock Co....dis 33⅓ %
Plate....dis 25 %
Yale Lock Co....dis 40 %
Sargent & Greenleaf....dis 20 %
Trenton, Branford, Norwich, Russell & Erwin, Norwalk, Nashua, Mallory, Wheeler & Co., P. & F. Corbin, Parker & Whipple, Jacobus & Nimick Mfg. Co....Rev'd list of Jan. '75 dis 45&5 %. 2 % extra for cash.
Padlocks, Russell & Erwin; " Mallory, Wheeler & Co.; " Wm. Wilcox & Co....List of Jan., '75. dis 45&5&2 %
" Romer's....dis 15 %
" Vulcan Hardware Co....dis 20 %
" New York Lock Co....dis 20 %
" J. H. McWilliams....dis 5 %
" Scandinavian Jail....dis 10 %
" Barnes & Deitz....dis 25 %
" D. K. Miller Lock Co....dis 30 %
" Penn Lock Works....dis 20 %

Mallets.
Hickory and Lignumvitæ....dis 20 %

Meat Cutters.
Dixon's (P. S. & W.) Nos. 1 2 3 4
₩ doz. $14 00 $17 00 $19 00 $30 00 dis 10 %
Miles Challenge....Nos 1 2 3
₩ doz. $22·00 $30·00 $40 00—dis 20 %
Perry's (P. S. & W.)....Nos. 200 300 400
₩ doz. $22·00 $27·00 $40·00—dis 10 %
Woodruff's (P. S. & W.)....Nos. 100 150
₩ doz. $15·00 $19·00—dis 10 %
Hales'....Nos. 11 12 13
₩ doz. $27·00 $33·00 $42·00—dis 25 %
Draw Cut....Nos. 5 6 7
Each $56·00 $90·00 $250 00—dis 20 %
American....dis 25 @ 25&5 %

No.	1	2	2½	3	4	B	5
Each	$6·00	$9·00	$12·00	$15·00	$30·00	$60·00	$75·00

Molasses Gates.
Stebbins'....dis 65&10 %
" Tinned ends....dis 40&10 %
Bush's....dis 20 %
Lincoln's....dis 50&10 %
Weed's....dis 15 %

Mortars and Pestles.
Iron....net

Nail Pullers.
Taft's....per doz $24·00 net

Nails....See Trade Report

Nuts and Washers.
Nuts....large, 6c; small, 8c off list.
Washers....large, 8c; small, 10c off list.

Oilers.
Miller's Zinc, Brass and Copper....dis 40 %
Sheet Metal Screw, Zinc....dis 37½ %
" " " Brass....dis 33⅓ %
Olmsted's....dis 25&10 %
Broughton's....dis 25&10 %
Malleable....per doz $5 00 dis 10 %
Prior's Patent or "Paragon"....dis 30&10 %

Ox Shoes.
Concave....₩ ℔ 13c net

Ox Balls....dis 60&10 %

Pencils
Faber's Carpenters'....net
" Round Gilt....₩ gross $6 00 net
Dixon's Lead....₩ gross $4·50 net
" Lumber....₩ gross 9·00 net

Picture Nails and Knobs.
Brass Head....dis 60&10 %
Porcelain Head....dis 55&10 %
Richards' Patent....dis 40 @ 40&10 %
Judd's....dis 60&10 %

Pinking Irons....per doz $2 75—dis 65 %

Planes.
First Quality....dis 35 %
Second Quality....dis 50 %
Bailey's Patent Adjustable....dis 20&10 %
Plane Irons, Butcher's....$5 50 to £ gold—new list
" Buck Bros....$5 50 to £ gold
" Auburn Tool Co.'s....dis 25 %
" Greenfield Tool Co....net list
" Middletown Tool Co....net list
" Ohio Tool Co....dis 10 %
" Spear & Jackson's....5 50 to £ gold—new list
" Sandusky Tool Co....dis 10 %
Plow Bits, Greenfield Tool Co....dis 10 %

Pliers and Nippers.
Button's Patent....dis 33⅓ %
Hull's Patent Nippers....dis 25 %
Leach's Patent Wire Cutters....per doz $6 50—dis 15 %
Gas Pliers....dis 25 %

Plumbs and Levels.
Chapin's....dis 66⅔&10 %
Standard Rule Co.'s New Adjustable....dis 60&10 %
Standard Rule Co.'s Non-Adjustable....dis 60&10&10 %
Stanley R. & L. Co.'s Pat. Adjustable....dis 60&10 %
" " Non-Adjustable....dis 65&10 %
Pocket Levels....dis 50&10 %
Johnson's Patent Adjustable....dis 60&10 %

Pulleys.
Hot House and Tackle....dis 60&10 %
Jap'd Screw....dis 60&10 %
Brass Screw....dis 60&10 %
Jap'd Side....dis 60&10 %
" Clothes Line....dis 60&10 %
Hay Fork....per doz $4 50 @ 5 00, dis 10 %

Pumps.
Douglas Cistern, etc....new list dis 25 %
" S. & F....new list dis 20 %
Union Mfg. Co's. Cistern and Pitcher....dis 25 %
" " " Rams....dis 20 %
" " " Garden Engines....dis 10 %
Cucumber (Burlingham & Purdy)—
6 ft. No. 2, with 12 ft. pipe....$4·00 net
6 ft. No. 1, with 12 ft. pipe....4·50 net
From 6 to 36 ft. add 20 cents per ft.
Pipe, 8c. per ft.; Coupling, 20c. per ft.

Punches.
Belt or Drive....per doz $1·50 net
Spring....per doz $7·00—dis 20&10 %

Rail.
Sliding Door, Wrought Brass....₩ ℔ 44c., dis 10 %
" " Iron, Painted....₩ foot 9c—dis 55&10 %
Barn Door, ⅜, ⅝ and ¾ inch....dis 60&10&10 %
" " for N. E. Hangers....dis 60&10&10 %

Rakes.
Cast Steel....dis 35 %

$8 00	9 00	10 00	11 00
8	10	12	14 teeth.

Malleable....dis 35 %

$5 00	5 50	6 00	6 50
9	11	13	15 teeth.

Razor Straps.
Evan's....dis 25&10 %
Genuine Emerson (B. F. Badger or C. Emerson)....dis 25 %
Imitation Emerson....₩ doz $2·75—dis 40 %
Hunt's....dis 40 %
Chapman....dis 10 @ 15 %
Torrey's....dis 10&10 %
Saunder's....net @ 10 %

Rivets.—Old Colony.
Iron and Tinned....dis 25&7½ %
In bulk....dis 7½ %
Copper Rivets and Burrs....dis 20 %

Nos.	7	8	9	10	11	12	13	14	15
Per lb.	49c	50c	52c	54c	56c	58c	60c	65c	70c

Rivet Sets....net

Rods.
Stair....new list dis 30 @ 33⅓ %
" American Patent....dis 33⅓ %

Rollers.
Barn Door....revised list dis 60, 10&10 %
Novelty....dis 10 %

Rope. Manufacturers' List of May 10, 1875.
Manila....½ inch and larger ₩ ℔ 15 c
" ....⅜ inch ₩ ℔ 15½c
" ....¼ and 5-16 inch ₩ ℔ 16 c
Manila Lath Yarn and Tar'd Rope....₩ ℔ 14½c
" Hay Rope....₩ ℔ 15½c
Sisal....½ inch and larger ₩ ℔ 12 c
" ....⅜ inch ₩ ℔ 12½c
Sisal....¼ and 5-16 inch ₩ ℔ 13 c
" Hay Rope....₩ ℔ 12½c

Rules.
Hubbard & Curtiss....dis 60&20 %

	Boxwood.	Ivory.
Chapin's	dis 66⅔&10 %	dis 50&10 %
Stanley	dis 70 %	dis 50&10 %
Standard	dis 70 %	dis 50&10 %
Stephens'	dis 70 %	dis 50 %

Sad Irons.
From 4 to 10 lbs....₩ ℔ 3¾ @ 4c net
Sad Iron, Nickel Stand attached....₩ ℔ 9c
Self-Heating....per doz $10 00 net
" " Tailors'....per doz 22 50 net

Sand Paper.
Beader & Adamson's (Flint) 00 to 1½..$4 25 ₩ ream } dis 15 %
" " " 2, 2½ & 3. 4 75 "
" " Assorted....4 25 "
" " Star....₩ ream $3 25
" " Emery....₩ ream $6 50 @ 11 50
H. B. & M. Roman Flint....dis 15 %

Sash Cord.
Common....₩ ℔ 18 @ 20c. net
Patent....₩ ℔ 24c. net
Silver Lake, Russia Flax....₩ ℔ 55c } net
" " White Cotton....₩ ℔ 55c
" " Drab Cotton....₩ ℔ 60c

Sash Locks.
Clark's, Nos. 1 and 2, $10·00 per gross....dis 33⅓ %
Ferguson's....dis 33⅓ %
Norwich....dis 15 %
Walker's....list net

Sash Weights.—Solid Eyes....₩ ℔ 2c

Sausage Stuffers or Fillers.
Miles....₩ doz $20—dis 10 %
Stow or Perry....₩ doz No. 1, $15; No. 0, $21—dis 15 %
Draw Cut No. 4....each $30 00—dis 20 %

Saw Frames....per gross $18 00—dis 10&10 %
Saw Rods....$10 list, dis 10&10 %

Saws.
Spear & Jackson's old pattern....$4 50 to £ gold
Spear & Jackson's American Pattern....$3·55 to £ gold
John Spear....$3 60 to £ gold
Am. Saw Co....new list
Perforated Cross Cuts, all kinds....68c ₩ foot
Inserted Teeth....dis 10 %
All else....dis 12½ %
Disston's Circular....dis 20 %
" Mill....dis 25 %
" Cross Cut....dis 15 %
" other kinds....dis 12½ %
Livingston's Framed Wood....list net
Livingston's Butcher and Kitchen....dis 12½ %
H. W. Peace's Circulars....dis 10 %
Other kinds....dis 10 %
Wm. McNiece's Hand, Cross Cut and Circular....new list dis 15 %
Wm. McNeice's Patent Pole Pruning Saw....dis 10 %
" " " Compass Saw....net.
E. M. Boynton's Lightning....dis 40 %
" " Others....dis 15 %
Wheeler & Clemson Mfg. Co.'s Hand....dis 15 %
" " " Cross-Cut....dis 30 %

Saw Sets.
Stillman's Genuine....₩ doz $5·00—dis 10 %
" Imitation....₩ doz 3·25—dis 20 %
Aiken's Pattern....₩ doz 7·00—dis 25&10 %
" Genuine....₩ doz $15·00—dis 25 %
Hart's Patent....dis 15 %
Nash's....dis 20&10 %
Bemis & Call's....dis 20 %
Hotchkiss'....₩ doz 5·50—dis 10 %
Common Lever....per doz $2 00—dis 20 %
Leach's....dis 15 %

Scales.
Hatch, Counter....₩ doz $36—dis 25 %
" Tea....₩ doz $15—dis 25 %
Union Platform....$6·00, $7·50—dis 40 %
Turnbull's....dis 20 %
Brown's....dis 25&5 %
Fairbanks'....new list dis 15 @ 20 %
Howe's....dis 15&5 %
Chatillon's Grocers'....dis 25 %
" Eureka....dis 20 %
Universal Family....dis 30 %
Scale Beams.
No. 1 800 to 1200 lbs....90c ₩ cwt } dis....33⅓ %
No. 2 " "....75c ₩ cwt

Scrapers.
Box, 1 Handle....per doz $6·25, dis 10 %
" 2 "....per doz 7·50, dis 10 %
Foot....dis 60 & 10 %
Ship (common)....per doz $3 00 net
Ship—Providence Tool Co....dis 10 %

Screw Drivers.
Hart, Bliven & Mead....dis 55&10 %
Douglass Mfg. Co....dis 20&10 @ 25&10 %
Disston's....dis 40&10 %

Screws.
Flat Head Iron, List of April 1, 1875....dis 62½ %
Round Head Iron " " "....dis 50 %
Flat Head Brass....dis 52½ %
Round Head Brass....dis 50 %
Round Head Silver Capped, List March 1....dis 25 %
Hand Rail....dis 55&10 %
Coach or Lag....dis 30&10 @ 40 %
Coach, Patent Gimlet Point, List Jan. 1, 1875....dis 35 %
Bed....list net
Japanned (List of Flat Head Iron)....dis 50 %
Machine—Flat Head, Iron, List Jan. 12, 1875....dis 25 %
" " Brass, " "....dis 15 %
" Round Head, Iron, " "....dis 20 %
" " Brass, " "....dis 10 %
English, Flat Head, Iron; American List.
Nettlefold & Chamberlain's....dis 60&10 %
Birmingham Sc'w Co....dis 60&10 %
Bench—Iron....dis 60, 10&10 %
" —Wood, Beach....₩ doz $3·00 net
" " Hickory....dis 20&10 %
Hand....dis 25&10 %
Jack—Bell Bottom....dis 15 %

Scythes.
Blood's German Steel, Grass....₩ doz $10 00 } dis $1·50 from list
" Cast " "....₩ doz 11 00
" Silver " "....₩ doz 12 00
" German " Grain....₩ doz 14 00
" Cast " "....₩ doz 15 00
" Excelsior and Granger. ₩ doz 11 00
" Young America....10 50
" Silver Clipper....13 00
Scythe Snaths....dis 20 %

Sieves.—Mann's Patent....dis 25 @ 30 %

	14	16	18	20	24	30 mesh
Iron	$4·00	4·00	4·25	4·50	4·75	6·50 ₩ doz
Plated	4·75	5·00	5·25	5·50	5·75	8·50 "

Wood Rims....18 mesh, $1·50 per doz, dis 10 %

Shears and Scissors.
Cast Steel....dis 75 @ 75&10 %
Cast Iron....dis 30 %
Heinisch Sons' Trimmers and Scissors....dis 65 %
" " Standard quality Shears and Trimmers....dis 45 @ 50 %
Seymour's Straight Trimmers....dis 60&10 %
" Scissors....dis 50 %
Pruning....per doz $10 00—dis 35 %
Barnard's Lamp Trimmers....per doz $3·75—dis 30 %

Sheaves.
Sliding Door, M. W. & Co. list....dis 45&5 %
" R. & E. list....dis 50 %
" Patent Roller....dis 25 %
" " " Hatfield's....dis 50 %
" Russell's Anti-Friction....dis 50 %
Sliding Shutter....dis 50&5 %

Shovels and Spades.
Ames....dis 12½ %
Birmingham Shovel Co....dis 15 %
Rowland's....dis 25 %
Old Colony....new list dis 10&5 %
Middleboro' Shovel Co....new list dis 12½ %
C. E. Jennings....dis 12½&5 %
Dunning's Shovels and Scoops....dis 20&7½ %
Snow Shovels....₩ doz $7 00 @ 8 00 net

Shovels and Tongs.
Iron and Brass Head, R. & E. list....dis 50 %
" " Hart's....dis 50&10 %
Polished Steel....new list dis 50 %

Skates.
Barney & Berry's
N. Y. Club....₩ pair $3·75 } dis 25 %
B. & B. Club....3·50
All Clamp....4·25
Rink....8·00
Florence Club....per pair $3·50—dis 25 %
" Steel....per doz $9 net
Peck & Snyder's—
American Club, Polished....₩ pair $5·00
" " Blued Top....₩ pair $3·75 net

Slates.
Square Frames, Round Cornered, by case....dis 40&10 %
Less than a case....dis 70 %

Spoke Shaves.
Iron....dis 33⅓&10 %
Wood....dis 30 %
Bailey's....dis 20&10 %

Spoons.
Tinned Iron....dis 10 %
By the case....dis 20 %
Basting....dis 10 %
Britannia....dis 50&5 @ 55 %
" Boardman's, new list....dis 55 %
Rogers & Bro., A 1....dis 50 %
Derby Silver Co....dis 50 & 5 %
Holmes, Booth & Haydens....dis 50 %
Nickel Silver Co....dis 40 %
German Silver....dis 30 @ 33⅓ %
Tin (P. S. & W.)—
Teas....$1·30 ₩ gross, net
Tables....2·75 " net

Stocks and Dies .... dis 5&10 %

Stone.
Hindostan Stone .... ℔ 6c } dis 20&10 %
" Axe Stone .... ℔ 8c
" Slips .... ℔ 10c
Sand Stone .... ℔ 6c—dis 20&10 %
Washita Stone .... No. 1, ℔ 22c net
" .... No. 2, ℔ 17c net
" Slips .... No. 1, ℔ 45c net
Arkansas Stone .... No. 1, ℔ $1·25 net
" Slips .... No. 1, ℔ $2·00 net
Grindstones, Family, J. F. Green & Bro .... dis 20 %

Stove Polish.
Joseph Dixon's .... ℔ gross, 6 00
Gold Medal .... ℔ gross $6 00 dis 25 %

Squares.
Steel .... dis 50 %; full cases, dis 50&10 %
Iron .... dis 50 %; full cases, dis 50&10 %
Nickel Plated .... add $2 50 @ $4 00 ℔ doz net
Try Squares and T Bevels .... dis 45&10 %
Star Try Squares and Bevels .... dis 30 %
Disston's Try Squares No. 1 .... dis 20 %
" " No. 2 .... dis 40 %
" " Improved .... dis 20 %

Tacks.
Full Weight American Iron .... dis 45&7½ %
Half Weight American Iron .... dis 72½&7½ %
Carpet .... dis 7½ %
Brads American Half Weight .... dis 50&7½ %
Finishing Nails .... ½ ⅝ ¾ 1 1¼ in. and over
℔ .... 25c 20c 18c 14c 12c dis 7½ %
Trunk and Clout .... ½ ⅝ ¾ 1 1¼ in. and over
℔ .... 25c 20c 18c 14c 12c dis 7½ %
Copper Tacks .... ℔ 50c—dis 7½ %
Iron Shoe Nails, ℔ 4-8 and longer, 9½c; 3½-8, 10c .... dis 7½ %
Double Pointed .... dis 33⅓&10 %

Tapes, Measuring.
American Flask and Cap Co .... dis 20 %
Eddy's .... dis 20 %

Tea Trays.
American Tea Tray Co .... dis 15 %

Thermometers.
Tin Case .... dis 50&10 %

Toe Calks.
.... ℔ 13c net

Tobacco Cutters.
Enterprise Mfg. Co. (Champion) .... dis 20 %
Wood Bottom .... per doz $12—dis 25&10 %
All Iron .... per doz $19·50—dis 25&10 %

Tinners' Tools and Machines.
P. S. & W .... list net

Traps.
Newhouse .... dis 20 %
Peck, Stow & Wilcox .... dis 30 %
Blake's Patent .... dis 30 %
Mouse, Wood Choker .... ℔ doz holes, 15 @ 16c
" Patent Choker (Union Nut Co.) .... ℔ doz holes 16 @ 18c net
" Round, Wire .... ℔ doz $1 80 to 2 00 net
" Square, " .... ℔ doz 2 00 to 2 50 net
" Cage, " .... ℔ doz 2 50, dis 10 %

Trowels.
Lothrop's Brick and Plastering .... dis 10 %
Disston's Plastering .... dis 12½ %
Disston's Brick .... dis 12½ %
Rose's Brick .... dis 5 %
Brades' Brick .... gold, dis 10 %
Worrall's Brick and Plastering .... dis 20 %
Garden .... dis 25 %

Triers.
Butter and Cheese .... dis 25 %

Ventilators (Window).
Nickel and Gilt .... per dozen $16·00 @ 18·00

Vises.
Trenton Vises, Solid Box.
40 to 160 lbs 16c
160 and over 18c
Peter Wright's .... ℔ 15½c. gold
Wilson's Solid Box .... dis 15 @ 20 %
31 to 160 lbs 18c
160 and upward 22c
Wilson's Parallel .... dis 30 %
Sargent's " .... dis 50&10&10 %
Backus & Union, Parallel .... dis 25 %
Buffalo, Parallel .... new list dis 25 %
Fisher & Norris' Double Screw Parallel .... dis 15&10 %
Trenton Parallel .... dis 15 %
Merrill's Parallel .... dis 15 %
Parker's .... dis 20 %
Stephens' Parallel .... dis 15 @ 20 %
Bonney's Saw Filers .... per doz $20—dis 20 %
Stearn's Saw Filers .... per doz $20—dis 20 %

Wheel Barrows.
Canal (Pugsley & Chapman) .... new list dis 12½ %
Coal, Garden and Stone (Pugsley & Chapman) .... dis 25 %

Well Wheels.
Revised list .... dis 60&10 %

Wire.
Brass and Copper .... dis 10 %
Bright and Annealed .... Nos. 0 @ 18 dis 40 @ 45 %
" " .... " 19 @ 26 dis 47½ @ 52½ %
" " .... " 27 @ 36 dis 52½ @ 57½ %
Coppered .... " 0 @ 18 dis 35 @ 40 %
Galvanized, Nos. 2 to 9 .... ℔ 8½ @ 9c net
Galvanized, Nos. 10 to 18 .... market list dis 10 @ 15 %
Tinned .... dis 25 @ 30 %
Cast Steel .... dis 15 @ 20 %
Tinned Broom Wire .... dis 30 @ 35 %
Galvanized Telegraph, Nos. 8 and 9 .... ℔ 9c @ 9½c
Galvanized Telegraph, Nos. 10 and 11 .... ℔ 10c @ 10½c
" " 12 .... ℔ 10½c @ 11c
Annealed Fence, Nos. 8 and 9 .... dis 40 @ 45 %
" Grape, " 10 to 14 .... dis 40 @ 45 %
Fence Staples .... ℔ 8 @ 8½ %
Stubs' Steel Wire .... $7 00 to £ gold
Judd's Picture Wire .... dis 50
Clothes Line Wire .... per coil 60c. net

Wrenches.
American Adjustable .... dis 45 %
Baxter's Adjustable "S" .... dis 20 %
" Diagonal .... dis 20 %
Collins & Co.'s .... dis 45 %
Coes' Genuine .... dis 40&5 %
" Pattern (Wrought) .... dis 50&10 %
" " (Malleable) .... dis 60&10 %
Lindsay's Patent .... dis 25 %
Taft's Pattern .... dis 70&10 %
Davis Patent Duplex .... new list dis 25 %
Bemis & Call's Patent Combination .... dis 20&5 %
" " Merrick's Pattern .... dis 25&2½ %
" " Brigg's Patent .... dis 15&10 %
Aiken's Pocket .... per doz $10·00—dis 4½&10 %

Wringers.

		Less than 2 doz	2 doz lots
Providence	℔ doz	$64 00	$62 00
Reliance	℔ doz	61 00	59 00
Universal—Extra	℔ doz	64 00	62 00
Novelty	℔ doz	64 00	62 00
Sherman	℔ doz	64 00	62 00
Eureka (Friction)	℔ doz	60 00	58 00

TIN WARE AND TRIMMINGS.

STAMPED TIN WARE, dis 5 %.

COMMON STAMPED WARE, &C.

Bucket Covers.

Quarts	½	1	2	3	4
Inch	4½	5 3-16	6 5-16	6¾	7 11-16
Per gross	$2·00	2·60	3·40	4·25	5·75
Quarts	6	8	10	12	
Inch	8⅝	9¼	9¾	10 9-16	
Per gross	$6·50	8·00	8·50	11·50	

Cake Box Covers.

	Small.	Medium.	Large.
Inch	11½	12½	13½
Per gross	$15·00	18·00	22·00

Pot Covers.

Inch	7¾	8¼	8¾	9¼	9¾	10¼
Per gross	$5·75	6·00	6·25	6·75	7·25	8·25
Inch	10¾	11¼	11¾	12¼	12¾	13½
Per gross	$8·75	9·50	10·00	13·00	13·75	16·50

Pie, Dinner or Scolloped Plates.

Inch	6	7	8	9	10	11
Per gross	$4·00	4·30	5·50	5·90	8·50	10·50

Deep Pie Plates.

Inch	9	10
Per gross	$8·50	10·50

Jelly Cake Pans.

Inch	9	10
Per gross	$7·50	10·00

Coffee Pot Covers.

Plain	1½	2	3	4	5	6 qts.
Inch	3	3¼	3¾	4¼	5	
Per gross	$1·15	1·40	1·60	2·00	2·75	3·00
Rimmed	2½	3	3½	4	4½ inches.	
Per gross	$2·25	2·50	3·00	3·50	4·00	

T. K. Breasts only.

Inch	7½	8	8½	9	9½	10	10½	11	11½
Per gro.	$6·00	6·50	6·75	7·25	7·75	9·50	10·00	12·00	13·00

Grater Plates.

Sheet	½	¾	1
Per gross	$3·00	6·00	11·50

Scolloped Cake Pans.

		Small.	Large.
Without Tubes	per gross,	$8·00	11·50
With Tubes	"	10·50	14·00

Stamped Square Pans.

No.	½	
Per gross	$7·50	14·50

Common Square Pans (One Sheet).
Per gross .... $11·50

Milk Skimmers (Plain or Pierced).
Per gross .... $4·00

Lettered Plates

Inch	5½	6
Per gross	$3·25	4·00

Steamer Bottoms.
Add $1 per gross, or 10c. per doz. to list of Pot Covers.

Tin Stove Pipe Rings.

Inch		4	4½	5	5½	6	7
Plain	per gro.	$4·00	4·50	5·00	5·50	6·00	7·00
Jap'd or Burn'd	"	6·00	6·50	7·00	8·00	8·50	10·00

Coffee Boiler Lips.

		Small.	Large.
To Rivet	per gross,	$0·80	1·10
To Solder	"	1·25	

STAMPED DEEP AND RETINNED WARE, dis 20 %.

Plain Stamped Water Dippers.

	½ pint.	Pint.	Quart.	2 quarts.	2½ quarts.
Per doz	·90	1·15	1·50	1·85	2·50

Retinned Milk Pans.

Qts	½	1	1½	2	3	4	5	6	8	10	12
℔ doz.	1·20	1·50	1·75	2·00	2·25	3·15	3·50	3·65	4·75	5·25	5·75

Dipper Bowls, Plain Stamped—

Pints	½	1	Quarts	1	2	2½
Per doz.	·50	·75	Per doz.	1·00	1·25	1·72

Dipper Bowls, Retinned—

Pints	½	¾	1	Quarts	1	2	2½
Per doz.	·75	·90	1·05	Per doz	1·40	1·75	2·25

Pans.
Dish Pans, Retinned Deep—

Quarts	7	8	10	14	17	21	30
Per doz.	8·50	9·50	11·00	13·00	16·00	19·00	30·00

JAPANNED TIN WARE, dis 5 %.

Canisters, Common	Pound	½	1	2	3		
	Per gross	$10·50	15·00	24·00	30·00		
Canisters, Hinged	Pound	1	1½	2	3	4	
	Per gross	$19·00	25·00	32·00	37·00	42·00	
Canisters, Square	Pound	2	4	6	8	12	16
	Per doz	$3·00	4·25	5·00	5·75	8·00	9·00

Candlesticks, Japanned .... No. 1 2
Per gross $8·00 7·00
Cake Boxes, Round .... per nest, $3·25
" Square .... per nest, 4·25
Chamber Pails, Japanned

Nos	2	3	4	5
Green, per doz	$8·00	9·00	11·00	13·00
Oak "	$9·00	11·00	12·00	13·50

Dust Pans, Corrugated .... per gross, $22·00
Box Graters .... per gross, $3·75
Molasses Cups .... Pint ½ 1 2 4
Per gross $13·00 16·00 28 00 42·00
Lunch Boxes, per doz .... 7 in $2·00; 8 in. $2 50
Pepper Boxes Japanned .. ℔ gross small, $3·00; large, $4·00
Toy Banks, House .... No. 1 2
Per gross $7·00 5·50
Toy Banks, Gothic .... No. 1, $6·00, No. 2, 4·00 per gross
Toy Cups, Straight .... No. 1 2 3
Per gross $3·75 3·25 2·75
Toy Cups, Flaring .... No. 1, $4·25; 2, $3·75 ℔ gross
Toy Pails, Covered .... No. 1, per gross $4·00
Toy Rattles .... per gross, $2·00
Trunks, Wire Handled .... per nest (5) $1·75
Spittoons, Tin .... per gross, $27

PLANISHED TIN WARE, dis 25 @ 30 %.

Planished Coffee Pots, Round.

Each	·60	·75	·85	·95	1·15	1·25	1·30	1·40
Pints	1	2	3	4	5	6	7	8

Planished Tea Pots, Round.

Each	·70	·80	·95	1·05	1·25
Pints	2	3	4	5	6

Planished Tea Pots, Oval.

Each	·70	·80	·90	1·05	1·15	1·40	1·75
Pints	1	2	3	4	5	6	8

Planished Pepper Boxes, No. 1 .... per doz., $1·52
Planished Flour Dredges, No. 3, $2·10; 4, 2·45 ℔ dozen.

Planished Round Coffee Biggins.

Pints	2	3	4	5	6	8
Each	$1·00	1·10	1·20	1·40	1·60	2·00

Planished Oval Coffee Biggins.

Pints	2	3	4	5	6	8
Each	$1·15	1·25	1·40	1·60	1·80	2·25

Planished Oval Chafing Dishes, Imperial Covers.

Inch	10	12	14	16	18	20	22	24
Each	$3·85	5·00	6·25	7·60	9·00	11·50	15·00	16·50

Planished Oval Chafing Dishes, Low Covers.

Inch	10	12	14	16	18	20
Each	$3·25	4·85	5·20	6·20	7·80	9·25

Planished Low Dish Covers.

Inch	10	11	12	14	16	18	20
Each	$ ·70	·80	1·00	1·25	1·50	2·00	2·75

Planished Imperial Dish Covers.

Inch	10	11	12	14	16	18	20	22	24
Each	$1·55	1·70	2·00	2·60	3·15	3·45	4·60	5·45	6·30

Planished Etnas, on Stands.

Pints	1½	2	3	4	5
Each	$0·90	1·00	1·20	1·50	1·75

Planished Liquor Mixers .... Nos. 0 1 2
Per doz $2·00 2·10 2·45

Planished Oval Melon Molds.

Nos	2	3	4	5	6	7	8	9
Each	$·60	·65	·70	·80	·90	1·00	1·15	1·35

Planished Oval Tumbler Warmers.
To fit 1, 2, 3, and 4 O. G. Urns .... each, $2·50

Planished Oval O. G. Urns.

Nos	0	1	2	3	4	5	6	7	8
Each	$4·90	5·45	6·30	7·00	7·75	9·25	11·25	12·50	15·50

Planished Round Urns.

Nos	0	1	2	3	4	5	6	7
Each	$4·20	4·85	5·45	6·30	7·75	9·00	11·00	14·25

Planished Round Oyster Dishes, (Complete) .. Nos. 1 2
Each $2·10 2·80
Planished Oyster Dish Plates .... Nos. 1 2
Each $0·25 0·30
Oyste Dish Covers .... Nos. 1 2
Each $0·30 0·35

Tea Pot Handles—P. S. & W .... dis 20 %
Stow's Patent Hollow Tea Pot Handles.
No. 1, Small 4½ inches .... per gross, $11·50
No. 2, Medium, 5⅜ " .... " 12·50
No. 3, Large, 6⅛ " .... " 13·50
No. 4, Ex. Large 7¼ in., for Wash Pitchers &c .... " 18·00
Solid Iron, Tin Tipped.
No. 10, Small, 4¾ inches .... per gross, $9·00
No. 15, Medium, 5½ " .... " 9·50
No. 20, Large, 6½ " .... " 10·75
Stow's Patent Hollow Tea Pot Handles, Adamantine Bronze—P. S. & W.
No. 12, Bronzed and Tin-Tipped .... per gross, $13·50
Saucepan Handles, Of Best Malleable Iron.
P. S. & W .... dis 20 %
Japanned.
No. 1, 5¼ inches long .... per gross, $3·50
No. 2, 6 " .... " 3·75
No. 3, 6½ " .... " 4·00
No. 4, 7¼ " .... " 4·25
No. 5, 8 " .... " 4·50
No. 6, 9 " .... " 4·75
Tinned.
No. 1, 5¼ inches long .... per gross, $4·25
No. 2, 6 " .... " 4·50
No. 3, 6½ " .... " 4·75
No. 4, 7¼ " .... " 5·25
No. 5, 8 " .... " 5·50
No. 6, 9 " .... " 5·75
Japanned .... per lb., ·16
Tinned .... " ·20
Iron Kettle Ears (P., S. & W.) .... dis 45 %
Half gross pairs in a package.

Tinned.

Nos	1	2	3	4	5	6	7
Per gross pairs	88c	$1·00	1·50	1·75	2·10	2·75	3·75

Black.

Nos	1	2	3	4	5	6	7	8
Per gross pairs	75c	88c	$1·35	1·50	1·75	2·25	2·75	4·00

Tinned Tea Kettle Ears.

Nos	4	5	6
Per gross pairs	$1·75	2·10	2·75

Extra Heavy Tinned Kettle Ears—French Pattern.

Nos	1	2	3	4	5	6	7
Per gross pairs	$1·00	1·25	1·50	1·75	2·00	2·50	3·00

Malleable Iron Kettle Ears for Coal Hods &c.
P., S. & W .... dis 20 %
No. 10 Small .... ℔, Tinned 20c; Black, 16c
No. 20 Medium .... ℔, " 20c; " 16c
No. 30 Large .... ℔, " 20c; " 16c
No. 40 Extra Large .... ℔, " 20c; " 16c
In cases of 100 lbs. each.
Milk Can or Boiler Handles—(P. S. & W.) 4½ in. dis 25 %
Plain, 8c.; Jap'd, 9c.; Tinned, 15c. per lb.; Malleable Clips or Ears to match, Tinned .... 20c per lb.
Toilet Ware Handles—4½ inches (P. S. & W.) .... dis 35 %
Plain with drilled holes, per lb 9c
Plain with Cast " " 8c
Plumbers' Scrapers—(P. S. & W) .... dis 25 %
Extra quality, length 6 in., per doz .... $4·00

METALS.

IRON.—DUTY Bars, 1 to 1½ cents per lb., Sheet, Band, Hoop and Scroll, 1½ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 3 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. Railroad, 70 cents per 100 lbs. Boiler and Plate, 1½ cents per lb.

Pig Iron—AMERICAN.
Foundry No. 1 .... ℔ ton, $27 00 @ 28 00
Foundry No. 2 .... " 25 00 @ 26 00
Gray Forge .... " 23 00 @ 25 00
White and Mottled .... "

SCOTCH.
Coltness .... Nominal " 31 00 @ 32 00
Glengarnock .... " " 32 00 @ 33 00
Gartsherrie .... " " 31 00 @ 33 00
Eglinton .... " " 29 00 @ 30 00

Bar Iron.
Am. Refined, at mill .... nominal ....

Rails.
Welsh, gold .... ℔ ton,
American, at works, currency .... " 48 00 @ 50 00
Old Rails 26 50

Scrap.
Wrought Scrap .... " 30 00 @ 32 00

Bar Iron from Store.
Common Iron.
¾ to 2 in. round and square .... } ℔ ton $57 50 @ 60 00
1 to 6 in. x ⅜ to 1 in .... }
Refined Iron.
¾ to 2 in round and square .... } " 62 50 @ 65 00
1 to 6 in. x ⅜ to 1 in .... }
1 to 6 in. x ¼ and 5-16 .... " 67 50 @ 70 00
Shafting Iron—3½ to 4 in .... " 72 50 @ 82 50
Rods—5-16 to ⅝ round and square .. " 65 00 @ 115 00
Bands .... " 77 50 @ 80 00
Hoops—¾ to 2 in .... " 87 50 @ 140 00
Swedish Iron.
Ordinary sizes .... " 132 50 @ 135 00
Plow size .... " 145 00 @ 150 00

Sheet Iron.

		Common American and English.	R. G. American.	R. G. English.
Nos. 10 to 20	℔	4c	5½c	5½c
21 to 24	"	4¼c	5½c	5½c
25 to 26	"	4½c	5¾c	5¾c
27		5c	6c	6c
28	"	5½c	6c	6½c

Galvanized, 1 to 20, prime, ℔ 9; 2d quality .... ℔ 8c
" 21 to 24 " " 9½ " .... " 8½c
" 25 to 26 " " 10½ " .... " 9½c
" 27 " " 11½ " .... " 10½c
" 28 " " 12 " .... " 11c
Patent Polished .... ℔ 14c
Russia, Nos. 8 to 16 .... " 16½c
" Stained, No. 1 .... " 15½c
Belgian .... " 10c
One piece Corrugated Sheet Iron Elbows.

CHARCOAL IRON.

4	5	5½	6	7 inch.	
$2·50	3·50	4·50	5·25	6·50 per doz.	

RUSSIA IRON.

4½	5	5½	6	7 inch.
$5·00	7·00	9·50	12·00	14·00 per doz.

COPPER—DUTY. Pig, Bar and Ingot, 5c.; old copper, 4 cents ℔; Manufactured (including all articles of which copper is a component of chief value) 45 % ad valorem.
American Ingot .... ℔ 23¼ @ 23½c
English " ....

SHEATHING, BRAZIERS COPPER, BOLTS, &C.
Braziers Copper, ordinary sizes, over 16 oz., per square foot .... 31c. ℔
Braziers' Copper, ordinary sizes, 16 oz. and over 12 oz., per square foot .... 33c. "
Braziers' Copper, 12 oz. per square foot and lighter .. 35c. "
Circles less than 84 inch in diameter .... 34c ℔
Circles, 84 inch diameter and over .... 37c. "
Segment and Pattern Sheets .... 34c. "
Locomotive Fire Box Sheets .... 31c. "
Sheathing Copper, over 12 oz. per sq. ft .... 30c. "
" " 12 oz. ℔ sq. ft. and lighter .... 35c. "
Bolt Copper .... 31c. "
Copper Bottoms, 38c. ℔ .... net
No Copper is Sheathing except 14x48 inches, and not to exceed 34 oz. to the square foot.

O'NEILL'S PATENT PLANISHED COPPER.
14x48.
14 and 16 oz. and heavier .... 37c. By the case, 36c. ℔
12 oz. and lighter .... 40c. " " 39c. "
Boiler Sizes.
7 in., 14x52. 8 in., 14x56. 9 in., 14x60
14 and 16 oz. and heavier .... 39c. By the case, 38c ℔
(And all sizes not over 20 inches wide.)
30x60
14 and 16 oz. and heavier .... 41c. ℔
12 oz .... 44c. "

TINNING.
14x48, by the case .... 6c. ℔ sheet
14x48, less than case .... 8c. "
Other sizes not larger than 30x60 .... 2½c. ℔ sq.
Larger than 30x60 .... 5c. "

LEAD—DUTY Pig $2 per 100 lbs.; old Lead, 1½ cent per lb.; Pipe and Sheet, 2½ cents per lb.
Spanish .... 7c gold
German Refined .... 6⅞c gold
English .... 7c gold
American .... 6½ @ 6¾c gold
Bar .... dis 10 % .... 8¾c.
Pipe .... dis 10 % .... 9½c.
Tin Lined Pipe .... dis 10 % .... 16½c.
Sheet .... dis 10 % .... 9½c.
Shot .... dis 10 %. Drop, 9½c. Buck, 10½c.

BABBITT METAL.
N. P. U .... ℔ 8½ @ 9c
A, 25c.; B, 20c.; C, 15c.; D, 12c. ℔.

SOLDER .... No. 1, 15c; No. 2, 13½ @ 14c

STEEL—DUTY: Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 2¼ cents; over 7 cents, and not above 11, 3 cents per lb. over 11, 3½ cents per lb. and 10 % ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.
Tool .... 15 @ 16c
Spring 10c
Homogeneous 12½c
Tire .... 12½ @ 13½c
Machinery (round and square) .... 10 @ 11c
File 11c
Sheet .... 14 @ 16c
Saw Plate, mill and mulay .... 14 @ 16½c
Saw Plate, gang and X cut .... 13 @ 14c
" circular as to size .... 18 @ 30c

Chrome Steel.
Tool .... ℔ 20 @ 21c
Tool, extra fine .... " 40 @ 75c
Spring .... ℔ 12c and upward
Machinery .... ℔ 14c
Hammer .... " 15c,
Gun or Homogeneous .... " 16c

English Steel.—payable in gold, net.
" Best Cast .... ℔ 17½c
" Extra Cast .... " 18½c
" Round Machinery, Cast .... ℔ 10½ @ 11½c
" Swaged, Cast .... " 19½c
" Best Double Shear .... " 17½c
" Blister, 1st quality .... " 14½c
" " 2d quality .... " 13 c
German Steel, Best .... " 11½c
do 2d quality .... " 10½c
3d quality .... " 9½c
Sheet Cast Steel, 1st quality .... " 17½c
" " 2d quality .... " 14½c
" " 3d quality .... " 12½c
File Steel, Flat and ½ Round .... " 12½c
" Square and Round .... " 12½c
" M.... .... " 13½c
Taper ½ to ¾ inch .... " 16c
" Taper 3 and 3¼ inch .... " 18c

SPELTER—DUTY: In Pigs, Bars and Plates, $1 50 per 100 lbs.
Silesian, cash .... 6⅞ @ 7c., gold
American " .... 7½ @ 11c., currency

TIN—DUTY: Plates, Sheets, Tagger and Terne, 1·1c per lb.; Electro-galvanized Plates, 2 cents per ℔; Manufactures of, not enumerated, 35 per cent. ad val. Bars, Block and Pigs, free. Banca, subject to duty of 10 per cent.
Banca .... ℔ 24½c., gold
Straits .... ℔ 20 @ 20½c., gold
English .... ℔ 19½ @ 20c., gold

CHARCOAL TIN PLATE.
I C 10x14, Prime Charcoal .... 10·25 @ 10·50
12x12, " .... 10·75 @ 11·00
14x20, " .... 11·00 @ 11·25
I X 10x14, " .... 12·50 @ 12·75
12x12, " .... 13·00 @ 13·25
14x20, " .... 13·50 @ 13·75
D C 12½x17 " .... 9·75 @ 10·00
D X 12½x17 " .... 12·00 @ 12·25
For each additional X add .... 2·25

COKE TIN PLATE.

	Best	2d Quality.	Ordinary.
I C 10x14	$ 9·50 @ 10·00	8·75 @ 9·00	8·25 @ 8·75
I C 12x12	10·00 @ 10·25	9·50 @ 9·75	
I C 14x20	10·00 @ 10·75	10·00 @ 10·25	

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20	$ 9·50	8·50 @ 9·00	8·00 @ 8·25
I X 14x20	11·75		
I C 20x28	19·50	17·00 @ 18·00	16·50
I X 20x28	24·00 @ 24·50		
I C 20x200	28·25 @ 28·50		

ZINC.—DUTY: Pig or Block, $1 50 per 100 lbs. Sheet 2½c. ℔.
Sheet .... cask 10½c
" .... open 10¾c

Old Metals.

(Dealers' Selling Price.)

Copper .... @ 20
Yellow metal .... 14 @ 15
Brass .... 13 @ 14
Heavy Composition .... 17 @ 18
Old lead, solid .... 6 @ 6¼
Tea lead 5
Wrought iron .... 1⅛ @ 1¼
Sheet iron .... 0⅞ @
Cast iron .... 1 @ 1¼
Machinery iron .... 1⅛ @
Zinc .... 5 @ 5¼
Pewter, No. 1 17
" No. 2 .... 10 @ 12
Spelter .... 5 @

Paints, Oils, etc.

Paints.
Black, lamp—Coach Painters .... ℔ 20c
" " Ordinary 6c
" Ivory Drop, fair 15c
" " best 28c
Black Paint, in oil .... kegs, 8c.; ass't'd cans, 11 c
Blue, Prussian, fair to best .... 50 @ 75c
" " " in oil .... 35 @ 65c
" Chinese, dry 63c
" Ultramarine .... 25 @ 30c
Brown, Spanish 1½c
" Van Dyke 9c
Carmine, 40 .... $12 0c
Green, Chrome .... 15 @ 23c
" " in oil .... 18 @ 27c
" Paris .... good, 30c; best, 40c
" " in oil .... " 30c; " 45c
Mineral Paints .... 1½ @ 4c
Orange Mineral 14c
Red Lead, American 9½c
" English 10½c
" Venetian (N. C.) dry 2½c
" " in oil .... ass't'd cans, 11c; kegs, 8½c
" Indian, dry 10c
Rose Pink 18c
Sienna American, Raw 4c
" Burnt 4½c
" " in oil .... 16 @ 20c
" Raw " .... 15 @ 25c
Umber, Burnt .... 4 @ 8c
" " in oil .... 16 @ 21c
" Raw .... 3½ @ 7½c
" " in oil .... 16 @ 22c
Vermillion, Chinese ....
" English .... 1 10, gold
" Trieste .... 1 10 "
" American, Common 25c
White Lead, American, pure dry 10c
" " in oil 11c
White, Paris, English, prime .... in bbls. 2½ @ 2¾c
Yellow Ochre, French .... 2½ @ 2¾c
" " in oil .... ass't'd cans, 11c; kegs, 8½c
" " Vermont .... in casks 1½c
" Chrome .... 17 @ 27c
" in oil .... 18 @ 28c
Zinc White, American No. 1 dry 9c
" 1, in oil 11c
" French (Paris) .... 11 c
" in oil 12

Oils.
Linseed Raw .... ℔ gal. casks, 65c. bbl., 69c
" Boiled .... " 70c. " 75c
Whale, Crude .... "
" Bleached Winter .... " 80c
Sperm, Crude .... " 1·65
" Winter unbleached .... " 1·90
" " Bleached .... " 2·00
Seal, Extra Refined .... "
Lard, Pure Winter .... " 1·30
" Spring .... " 1·20
Cotton Seed, Crude .... " 60c
" Southern Yellow .... " 65c
" White .... "
Neatsfoot, Winter .... 70c @ $1·10
Natural Lubricating .... 33c @ 40c

Sundries.
Asphaltum 9c
Benzine .... ℔ gal. 16c
Chalk 1½c
" Block 1
Dryer, Patent, Am'n .... ass't cans, 10½c.; kegs 9c
" English .... 11c.; " 9
Flocks 50c
Frostings 40c
Glue, White .... 33 @ 47c
" Sheet 30c
Glaziers' Points, Zinc 9c
Gum, Copal 36c
" Damar 35c
" Shellac, English 85c
" " dark 75c
Litharge 10c
Pumice Stone, selected Lumps .... 4 @ 6c
" powdered 4c
Putty in bladders 3½c
" in bulk 3c
Rotton Stone, soft, English 8c
Spirits Turpentine 34c
Whiting, Spanish 1c

Glass.
French Window—1st, 2d, 3d, and 4th qualities. For box of 50 feet.

SINGLE THICK.

SIZES.	I.	II.	III.	IV.
6 x 8 to 10 x 15	$7·50	$6·75	$6·25	$5·75
11 x 14 to 16 x 24	8·50	7·75	7·25	6·50
18 x 22 to 20 x 30	10·75	9·75	8·75	7·75
15 x 36 to 24 x 30	12·25	10·75	9·00	
26 x 28 to 24 x 36	13·00	11·50	9·75	
26 x 36 to 26 x 44	14·50	13·25	10·75	
26 x 46 to 30 x 50	15·00	14·00	11·25	
30 x 52 to 30 x 54	16·00	14·50	12·00	
30 x 56 to 34 x 56	17·25	15·50	13·50	
34 x 58 to 34 x 60	18·25	17·25	15·00	
36 x 60 to 40 x 60	20·75	18·75	17·25	

DOUBLE THICK.

SIZES.	I.	II.	III.	IV.
6 x 8 to 10 x 15	$12·00	$11·00	$10 00	$9·25
11 x 14 to 16 x 24	13·75	12·50	11 75	10·50
18 x 22 to 20 x 30	17·25	15·75	14·00	
15 x 36 to 24 x 30	19·75	17·25	14·50	
26 x 28 to 24 x 36	21·00	18·50	15·75	
26 x 36 to 26 x 44	23·25	21·25	17·25	
26 x 46 to 30 x 50	24·00	22·50	18·00	
30 x 52 to 30 x 54	25·75	23·25	19·25	
30 x 56 to 34 x 56	27·75	25·00	21·75	
34 x 58 to 34 x 60	29·25	27·75	24·00	
36 x 60 to 40 x 60	33·25	30·00	27·75	

Sizes above—$12·00 per box extra for every 5 inches.
An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 81 united inches will be charged in the 84 united inches bracket
Discount 50 @ 50&5 %.

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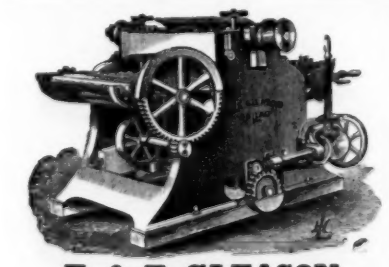

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SCREW WRENCHES.
Manufactured by
L. COES & CO.,
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Established in 1839.
Registered March 31, 1874.

We invite the particular attention of the trade to our New Straight Bar Wrench, *widened*, full size of the larger part of the so called "reinforced or jog bar." Also our enlarged jaw, made with ribs on the inside, having a full bearing on the front of bar (see sectional view), making the jaw fully equal to *any* strain the bar may be subjected to.

These recent improvements in combination with the nut inside the ferrule firmly screwed up flush, against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

We would also call attention to the *fact*, that in 1869 we made several *important* improvements (secured by patents), on the old wrench previously manufactured by L. & A. G. Coes which were *at once closely* imitated and sold as the *Genuine* Wrench by certain parties who seem to rely upon *our* improvements to keep up their reputation as manufacturers, and although the fact of their imitating our goods may be *good* evidence that we manufacture a superior Wrench, we wish the trade *may not be deceived* on the question of *originality*. Trusting the trade will fully appreciate our *recent* efforts, both in improvements on the Wrench and in the adoption of a Trade Mark, we would caution them against imitations. None genuine unless stamped

"L. COES & CO."

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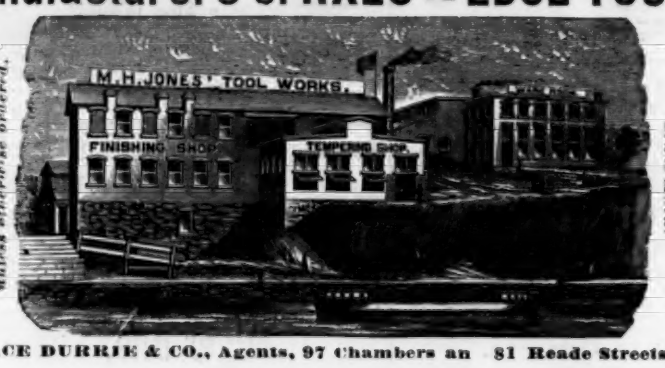
M. H. JONES & CO.
COHOES, Albany Co., N. Y.
Manufacturers of AXES AND EDGE TOOLS.



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Hammer Pointed, Polished & Blued
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Orders promptly filled at lowest market rates.
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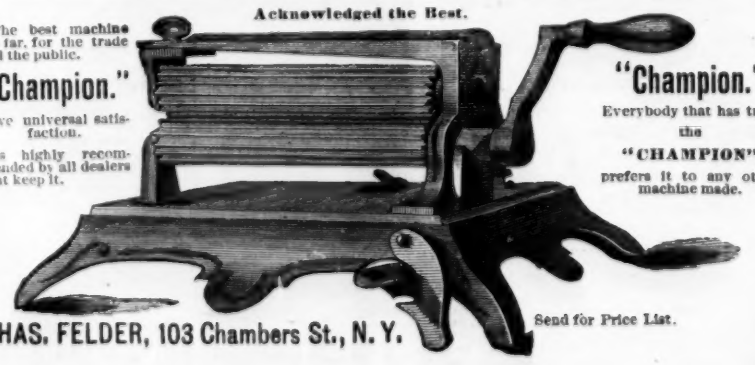

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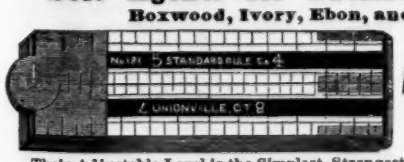

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Shovels and Spades.

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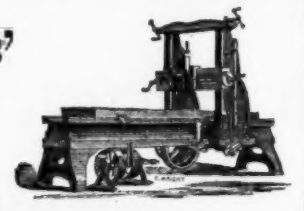

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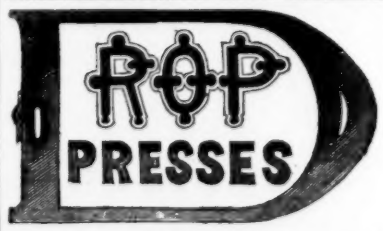

Bennett Hotchkiss and N. C. Stiles' Patent.

This Drop (which has been illustrated in this journal as of that class in which the Hammer is raised by a stiff belt or board passing up between two friction rolls, and is so well known that we will only describe our improvements. The patents we are working under are those of Bennett Hotchkiss (who in an interference case with Goulding and Cheney was declared the first inventor) and N. C Stiles. Our improvements consist:

First.—Of an arrangement of parts that makes it the most complete Jobbing Hammer, and will take the place to a great extent, of all other kinds for forging. In addition to the upright rod, which is operated by the hammer to open and close the rolls, we place another rod the lower end of which is secured to the end of a lever which is operated by the hand or foot, which operation also opens and closes the rolls at will. The lower end of this rod has a slot, so that the action of the hammer will not disturb the hand lever, thereby preventing the hand being injured, as otherwise would be the case.

Second.—No dog is used on the upright to hold up the hammer. The belt or board passes up between two clamps located under the rolls, so arranged that as the hammer rises they will freely open of themselves, but on descending they will close and hold up the hammer. To let the hammer fall the clamps are opened by pressure upon the foot treadle.

Third.—The board or belt is secured to the hammer by an elastic connection, which prevents the sudden jar and destruction of the same. The back roll is made adjustable to different thicknesses of board or belt, as also are the clamps. An adjustable collar on the upright rod allows the operator to obtain *any hight* of blow desired automatically. If one blow is wanted, press upon the treadle and remove the pressure as soon as the blow is given. Keep the foot upon the treadle and the blows will be repeated until the pressure is removed. If a blow of less hight than the collar is set for is required, work the hand lever, which will give you any hight of blow desired. The hammer can be held up at any point below the collar by bringing the hand lever into action when the hammer is at the desired hight, so that the next blow can be given from a state of rest, of less hight than the collar is set for. This is a feature no other drop has; that is, the first blow struck can be of less hight than the second or third, and obtained from a state of rest. A gentle pressure upon the treadle will allow the hammer to go down slowly, but it will stop and remain suspended at any point as soon as the pressure is removed.

The clamps in holding up the hammer keep the boar from touching either roll and prevents the same fro being worn uneven.

Manufactured only by the

Stiles & Parker Press Co.,

MIDDLETOWN, CONN.

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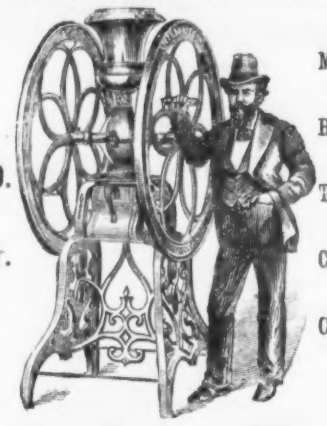
TO THE
Enterprise Manuf. Co. of Pa.,
PHILADELPHIA,
FOR
AMERICAN
COFFEE, DRUG AND SPICE MILLS,



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Bung Hole Borers,
Tobacco Cutters,
Cheese Cutters,
Cork Pressers,
&c., &c.

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No Extra Charge
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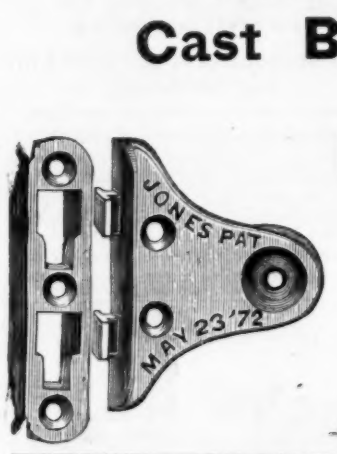
AND



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Sole Manufacturers of the Celebrated
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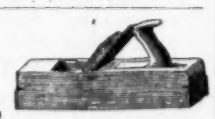

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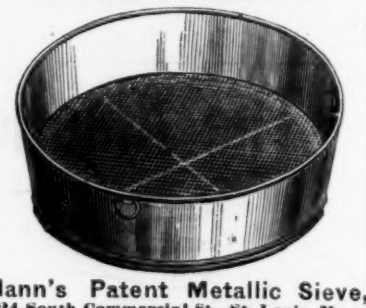

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The Whitewater Wagon has for many years stood the climatic tests of every section of the country, and on account of its quality of material and workmanship it is now used for the public service by both the United States and Canadian Governments. It may be found in the principal markets of the country, and at prices to compete with strictly first-class work. All timber is seasoned two years before use. Ironing is heavier than any competing wagon. Its style and finish are very superior. A peculiar feature of the skeins gives lighter draft than any other wagon. Send for Catalogues and prices.

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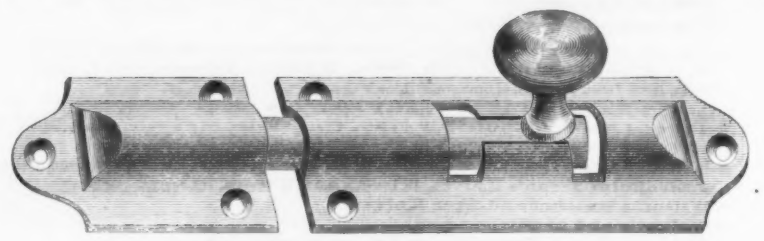

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SHUTTER BARS, STORE DOOR HANDLES, &c.,
In great variety.
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FILES and HORSE RASPS.
Rough & Ready
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CLIPPER SCYTHES,
Warranted.
Manufacturers of the
CHALLENGE
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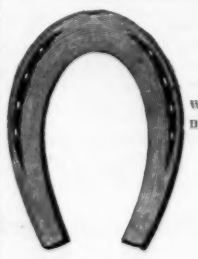

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Terms, 30 days. For 60 or 90 days, interest added at 0 per cent. per annum.

Anvils.—Solid Cast Steel.....₱ lb 14c
Peter Wright's, (Advanced April 1st.)₱ lb, gold, 11½c
Wilkinson s..... " 11c
Eagle.....list 11 cents—dis 20 @ 20&10 %
Apple Parers.—Union.....per doz $7 50
Skeleton..... " 7 50
Victor..... " 7 75
Domestic..... " 7·75
Reading..... " 7 75
Bay State Paring, Coring and Slicing..... " 12 00
" " Peach Parers..... " 10 50
Axes.—Mann's Light.....Per doz. $12 00 @ 11 50
Hunt's Light..... " 14 00 @ 12 50
Red Indian, all sizes..... " 12 00 @ 11 50
Red Chiertain, all sizes..... " 12 50 @ 12 00
Crown Prince..... " 12 50 @ 12 00
Augers and Auger Bits.—Pierce's Pat.
Twist Bits.....dis 30 %
Douglass' & Ives' Bits.....dis 40&10 %
Connecticut Valley Auger Bits.....dis 40&10 %
Cook s Bits.....dis 40 10&10 %
Jennings' Bits.....dis 10 %
Bates' Nut Augers.....dis 40&10 %
Douglass' & Ives' Augers.....dis 40&10 %
Watrous' Ship Augers.....dis 10&15 %
Bonney's Pat. Hollow Augers.....dis 25 %
Stearns' Patent Hollow Augers.....dis 25 %
Balances.—
Landers, Frary & Clark's..... } Sold on Morton's new
Morton's..... } List.....dis 50 %
Chattilon's.....
Common Spring with Hook.....₱ doz $1 38 @ 2 00
Bells.—Bevin Bros. Mfg Co. Light Hand Bells.....dis 70 %
Common (Tissue Paper Weight).....dis 70&10 %
Swiss Pattern Hand Bells.....dis 50 %
Connell's Door Bells.....dis 50&5 @ 50&10 %
Gt. Western & Kentucky Cow.. dis 50&10 @ 50 10&5 %
Boring Machines.—Bates' Mfg. Co., complete with augers.....dis 20 @ 25 %
Douglas Mfg. Co., complete with augers..dis 20 @ 25 %
Common Boring Machines, no Augers.....$4 00 @ 3 75
Angunar " " ..... 5 00 @ 4 75
Bolts.—Eastern Carriage Bolts .....special prices
Western " " .....
Philadelphia " " .....dis 60 %
" Eagle, (Coleman's).....dis 60 %
Wrought Snutter, Stanley.....dis 50 @ 50&10 %
Braces.—Barber s.....dis 40&5 %
Backus.....dis50 %
Bartholomew s American Ball....dis 10&10 @ 15&10 %
Spofford.....dis 50 %
Butts.—Cast Fast Joint, Narrow... dis 25&10 @ 30&10 %
" " Broad.....dis 35&10 @ 40&10 %
Cast Fast Loose Joint.....dis 45&10 @ 50&10 %
" Acorn, Loose Pin.....dis 40&10 @ 45&10 %
" Mayers & Parliament.....dis 35&10 @ 40&10 %
" Acorn Jap'd.....dis 40&10 @ 45&10 %
Wrought Loose Pin.....dis 35&10 %
" Table Hinges and Back Flaps....dis 30&10 %
" Narrow.....dis 30&10 %
" Loose Joint.....dis 35&10 %
Parker's Blind Butts.... } Discount 50&10 % by the case
Sheperd s " .... } 60 %.
Garretson's " .... }
Clark's " .... }
Lull & Porter's .... }
Garretson's Blind Butts Light No. 0.... } Discount 60 %
" " Lull & Porter Pattern } By the case
Cherrytree Blind Butts } 60&10 %
Chains.—German Halter.....dis 20 %
" Coil.....dis 20 %
Galvanized Fump.....net 13 @ 13½c
nest Proof Coil Chain—
₱ lb.. 14 10¼ 9½ 9 8¾ 8½ 8c gold
3-16 ¼ 5-16 ⅜ 7-16 ½ ⅝ in.
By the cask, 560 lbs., ½c per lb. less Common Chain. ½c per lb. less.
Chisels.—Socket Framing.....dis 60 @ 60&10 %
Socket Firmer.....dis 60 @ 60&10 %
Tang " .....dis 40&10 @ 50 %
Beatv s Framing and Firmer.....dis 20 %
Casters.—Iron Bed.....dis 30&10 @ 40 %
Porcelain Wheel Bed.....dis 30&10 @ 40 %
Iron and Brass Wheel Plate.....dis 40 @ 40&10 %
" Porcelain Wheel .....dis 50 @ 50&10 %
Clothes Wringers.—Universa.....per doz $64 00
Noveity..... " 64 00
Discount on 2 dozen lots. $2 per dozen.
Coffee Mills.—Common Box and Side.....dis 15 %
Patent Box and Side.....dis 15 %
Cutlery.—American Pocket (best).....dis 25 %
Landers, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices
Drawing Knives.—Hart Mfg. Co. s.....dis 60 %
Adjustable Handle.....dis 10 @ 15 %
Beatty.....dis 15 @ 20 %
Fry Pans.
Tinned.....dis 40 @ 45 %
₱ doz..$3·50 4 00 4·50 5·00 5·50 6·50 7·50 9·00 10·00
No.... 0 1 2 3 4 5 6 7 8
Burnished.....dis 40 @ 45 %
₱ doz..$5·00 3·75 4 25 4·75 5·25 6·00 7·00 8 00 9·00
No.... 0 1 2 3 4 5 6 7 8
Files.
Nicholson Mill Files.....new list
" Bastard.....
" Taper.....
Butcher's Mill (Advanced March 8th)...$5 25 to £ gold
" Bastard..... 5 25 to £ gold
" Taper..... 5 25 to £ gold
Fluting Machines.
K. F. M.—4¼ in. rolls, $5·50.....dis 15 %
" —6 in. rolls, $6·50.....dis 15 %
Mrs Knox—4 in. rolls, $5·75.....dis 20 %
" —6 in. rolls, 7·00.....dis 20 %
Hammers.
Yerkes & Plumb's.....dis 15 %
Hammond & Son's.....dis 15 %
Verce.....dis 20 %
Hatchets.
Beatty's.....dis 15 @ 20 %
Shingling and Half. { ₱ doz...$7·00 7·50 7·75 8·00
{ No..... 1 2 3
Yerkes & Plumb.....dis 15 %
Shingling and Half. { ₱ doz...$7·00 7·50 8·00 8·50
{ No..... 1 2 3 4
Claw.... { ₱ doz..... $7·50 8·00
{ No..... 1 2 3
Hinges.
Strap and T, (Changed March 24).....dis 45 %
Horse Nails. Nos. 6 7 8 9 10
Ausable..... 27 25 24 23 22
Globe..... 28 26 25 24 23
Brundage..... 26 24 23 22 21
Nos. 5 6 7 8 9 10
Putnam..... 32 28 26 25 24 22
On Ausable, Globe and Brundage 1000 ₱ lots.....dis 5 %
Knobs.—Door, Mortise and Rim.
Makes in Combination.....new list dis 45&5 %
Extra discount for cash 2 %
Mineral and Rim.....dis 5 %
Locks and Latches.—Rim and Mortise.... dis 45&5 %
Extra discount for cash 2 %
Till and Cupboard.....dis 25 %
American Padlocks.....dis 50 %
Scandinavian Pad Locks.
₱ doz.....$10·50 10·50 12·00 12·00 15·00 15·00 } dis 15 %
No..... 9 9½ 10 10½ 11 11½ }
₱ doz.....$18·00 18·00 22·00 22·00 } dis 15 %
No..... 12 12½ 13 13½ }
Trunk Locks.....dis 5 @ 10 %
Thumb and Roggens Latches.....dis 25 %
Lanterns. Square Candle and Oil.....dis 10 %
Globe for Oil.....dis 10 %
" Kerosene.....dis 10 %
Tubular Lanterns.....dis 10 %
Mattocks.—Long and Short Cutter.....dis 25 %
Western Pattern.....dis 25 %
Pennsylvania Pattern.....dis 15 %
Moinsses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.....dis 20 %
Stebbins' Gates.....dis 60&10 @ 65&10 %
Lincoln's " .....dis 40&10 @ 50 %
Landers, Frary & Clark's Petroleum.....dis 15&10 %
Taylor's Petroleum Faucets.....dis 20&10 %
Brass Liquor Cocks.....dis 20&10 %
Meat Cutters.—Dixon's.....dis 15 %
Woodruff.....dis 15 %
Stowe.....dis 15 %
Hale's.....dis 25 %
Stuffers.....dis 10 %
Planes.—Auburn Tool Co.. "Bench".....dis 40 %
Second Quality.....dis 50 %
Metallic Plane Co.....dis 25&5 %
Evans Pat. Circular.....net
Plumbs and Levels.
Adjustable.....dis 60&10 %
Non-Adjustable.....dis 60, 10&10 %
Plane Irons.—American.....list net
Butcher's.....gold £, $5 50
Picks.—Philadelphia.....net
Pittsburgh.....net
Rules.....dis 60, 10&10 @ 70 %
Rakes.—Cast Steel Garden.....dis 40 @ 40&5 %
Malleable Garden.....dis 40 @ 40&5 %
Wood Head Iron Teeth.....dis 40 %
Steelyards.—American Pattern.....dis 15 %
₱ doz.....$5·50 7·00 9·00 10·00 11·00 12·00
No..... 50 100 150 200 250 300
English Pattern.....dis 15 %
₱ doz.....$7·00 8·67 10·67 12·67 14·67 16·67
No..... 50 100 150 200 250 300
L. F. & C. Excelsior.....dis 10 %
₱ doz.....$9·00 10·00 12·00 15·00 18·00 21·00
No..... 50 100 150 200 250 300
Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened.....₱ doz. $10·00 net
Golden Clipper No. 10, Boxed and Sharpened.....₱ doz $9·75 net
Green Clipper No. 8, Boxed and Sharpened.....₱ doz $9·50 net
Common Scythes.....₱ doz $7·50 @ 9·00
Squares.—Steel and Iron, new list.....dis 50 %
Saws.—Disston's Cross Cut.....dis 15 %
Disston's Hand.....dis 12½ %
W. McNiece's H'd, Cross-Cut & Circ'r, new list. dis 15 %
Boynton's Lightning, new list.....dis 40 %
" Champion.....dis 45 %
Shovels and Spades.
Rowland's Plain Back, Jan. 23d.....dis 25 %
" Back Strap " .....dis 25 %
Oliver Ames & Sons.....new list dis 12½ %
Brady Shovel Co.....dis 12½&2½ %
Sad Irons.—Richmond (polished face).....per lb. 3¾c
Richmond (polished face)... ... by the cask " 3¼c
Stone.—Arkansas Oil, No. 1.....₱ lb $1·38
Turkey Oil, No. 1..... " 1·00
Washita Extra..... " 30c
" No. 1..... " 22c
" " 2..... " 18c
" " 3..... " 5½c
Screws.—Iron.....new list, April 1st, 1875, dis 62½ %
Brass.....dis 52½ %
Spoons.—
Plated.....dis 40&10 @ 50 %
Britannia, Boardmans (new list).....dis 50&10 %
" Parkers (old list) .....dis 50 %
German Silver.....dis 30 %
" Light.....new list dis 35 %
Lalance & Grosjean Iron.....dis 10 %
Springs.—Gray's Door.....dis 50 @ 50&10 %
Torry's Door.....dis 50 @ 50&10%
Stocks and Dies......dis 10&5 %
Stove Polish.—Gem.....₱ gross, $5·00
Onyx..... " $5·00
Try Squares.—Winterbottom.....dis 10 @ 15 %
Stanley Rule and Level Co.....dis 45&10 %
Willis Thrall, No. 2.....dis 30&10 %
Disston's No. 2.....dis 40 %
Tacks, &c.—Half Weight Tacks.....dis 72½ %
" " by the case...dis 72½&7½ %
Clout and Finishing Nails.....7½ %
" " by the case.....dis 7½ %
Traps.—Genuine Oneida—Newhouse list.....dis 20 %
Imitation " " .....dis 30 %
Vises.—Solid Box, currency.....₱ lb net 14c
Wrenches.—Coes Genuine.....dis 40 @ 4?&5 %
Coes Imitation Wrought Bar .....dis 50&50&10 %
" " Malleable Bar.....dis 60&10 %
" " (Kellogg) Malleable Bar.....dis 65&10 %
Tafts Pattern (Wrought Bar) .....dis 70 @ 70&10 %
Philadelphia Tool Co.'s Pat. Duplex.....dis 25 %
" " Improved Baxter.....dis 25 %
" " Adjustable Fork.....dis 25 %
Wire.—No. 0 to 18.....(Advanced April 24th)....dis 40 %
No. 19 to 26..... " " ....dis 47½ %
No. 27 to 30..... " " ....dis 52½ %
Coppered u to 13..... dis 15 @ 20 %
Tinned Broom Wire.....dis 25 %
Galvanized Wire No. 1 to 13 .....dis 40 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.

June 1, 1875.

Augers—Snell Mfg. Co.....dis 25 %
Bits, Auger—Snell Mfg. Co.....dis 25 %
Phœnix.....dis 25 %
Bells, Cow—Yaw s Genuine.....dis 40 %
Bolts—Carriage and Tire.....dis 30 %
Braces—Bit, Spofford's Patent.....dis 75&5 %
Brads, Cut.....dis 50 %
Boards—Stove, Brooks' Patent.....dis 50&7½ %
Butts—Brass.....dis 35 %
Wrought Narrow.....dis 30 %
" " Broad, Loose Joint.....dis 30 %
" " Table and Back Flaps.....dis 35 %
Wrought Butts, Loose Pin.....dis 30 %
Belting—Rubber.....dis 35 %
Leather, new list, oak tanned.....dis 30 @ 10 %
Brick—Bath (box of 2 doz) Best English.....dis 20 %
" Rutherford .....$1·25
Can Openers—Sprague's.....$1·00
Cases—Parlor Coal Hod.....dis 50 %
Chalk—White, Carpenter s .....dis 10 %
Red, Carpenter's .....₱ gross, 57c
Blue, " 90c
Chisels—Firmer Socket.....$1·00
Framing Socket.....dis 60, 10&10 %
Corner Socket Chisels.....dis 60, 10&10 %
Slick's Carpenters'.....dis 60, 10&10 %
Castings—Malleable .....dis 60, 10&10 %
Egg Beaters—"Peerless".....₱ lb 10c
"Centripetal' .....per doz $3·60
Elbows—Corrugated..... 5 5½ 6 7 } per doz 5·00
Charcoal.....$3·50 4·50 5·25 6·50 }
Russia..... 7·00 9·50 12·00 14·00 } dis 10 %
Files—Malechoss Bros.....dis 50 %
Fluters—Geneva Hand.....dis 50 %
Freezers Ice Cream—" Champion .....₱ doz. $18·00
Hammers—Henry W. Kip's.....dis 33½ %
Hinges, Gate—Shepard's.....dis 7½ %
Hinges—Window Bling—.....dis 50&10 %
Shepard's and Standard.....
Wrought Strap and T.....dis 60&10 %
Hods, Coal—Plain ,Black and Galvanized.....dis 33½&10 %
Funnel, Black and Galvanized.....dis 10 %
Fancy and Helmet.....dis 10 %
Sad Irons.....dis 10 %
Kettles—Brass.....3¾c
Copper, " Hand Made".....₱ lb. 45c
Enameled.....dis 40 @ 45 %
Knives, Drawing—Oval No. 1.....dis 50&10 %
Razor Blade.....dis 60, 10&10 %
Lanterns "Peerless. ....No. 1 3 5 } dis 60&10 %
₱ doz $36 00 $10 50 $13 75
Tubular.....dis 10 %
" with Guards.....$11·00
Machines—Apple Parting, "Turn Table".....11·50
Machines, Boring—Snell's.....7.75 ₱ doz
Mills, Coffee—Box and Slide, common.....dis 20 %
Box Union and Eagle.....dis 15 %
" American.....dis 15 %
Molasses Gates—"Self Measuring".....dis 20 %
Nails—Clout and Finishing.....dis 20 %
Shoe:.....dis 7½ %
Horse, Ausable.....No. 5 6 7 8 9 10
30 27 25 24 25 22c
" " Pointed & Polished.....add 1c ₱ lb
" " 1000 lbs.
" Clinton.....No. 6 7 8 9 10 dis 5 %
21 19 18 17 16c
Packing—Rubber.....dis 30 @ 10 %
Paint—White Lead, U. S. Gov't.....₱ lb 8½c
Rivets—Iron, Black and Tinned.....dis 25&7½ %
Rope—Manila, ½ inch and larger.....₱ lb 14½c
Sisal, ½ inch and larger.....11½c
Jute, all sizes.....9½c
Screws—"American Screw Co"—
Flat Head, Iron.....dis 62½ %
Flat Head, Brass.....dis 52½ %
Skates and Straps—White's.....dis 20 %
Spoons, Iron Tinned.....dis 10 %
" by the case.....dis 20 %
Plated Rogers' A No. 1.....dis 50 %
Britannia.....dis 50&5 %
Squares—Steel and Iron.....new list 50 %
Scales—Buffalo Scale Works.....dis 25 %
Fairbanks.....dis 15 %
Stove Polish—Gem.....₱ gross, $4·50
" Dixon's.....6·00
Traps, Steel—Newhouse.....dis 20 %
Tacks—Half Weight Am. Iron.....dis 72½&7½ %
Vases—Palace Coal.....dis 10 %
Vises—Parallel, Buffalo.....dis 30 %
Ware—French, Tinned and Iron.....dis 25 %
Stamped and Japanned.....dis 5 %
Cast Iron Hollow.....dis 33½ %
Tin Plates.—Add for each X.....2·50
10x14, IC. Charcoal...$11·00 | 14x20 C. terne.....$10 00
12x12, " ... 11 50 | 20x28 C. " .....20·50
12½x17, " ... 11·00 | 20x28 X. " .....25·00
14x20, " ... 12·00 |
Pig Tin—Straits.....25c @ 26c
Bar Tin.....27c
Solder—No. 1, Crook's.....16½c
Refined, No. 1, 15½c; No. 2.....14½c
Sheet Zinc—
"Lasalle '.....570 100 ₱ lb casks
$10 75 11·05 ₱ 100 lbs
Sheets.....$10·75
Iron Wire—Bright and Annealed.....dis 40 %
Coppered.....dis 40 %
Tinned.....dis 25 %
Tinned Broom, { Nos. 20 21 22 } dis 30 %
{ 20c 21c 21c }
Copper—Sheathing 14 @ 18 oz.....₱ lb 30c
Planished.....₱ lb 37c @ 39c
Bottoms.....₱ lb 33c
Bolts.....₱ lb 31 @ 33c
Braziers' Sheets.....₱ lb 31 @ 33c
Sheet Iron.—
18 Common.....$4 50
24 Common.....4 50
24 W. D. Wood & Co., Smooth Finish.....5 50
Am. Russia..... A. B.
14c 11c
Gen. Russia, No. 1 stained.....16½c
" clean.....14½c
Galvanized.....dis 35 %

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers Metals, No. 214, 216 and 218 Main street.

Tin Plate.—I. C. 10x14 Charcoal.....$12 00 @ 13·00
I. X. 10x14 Charcoal.....14 50 @ 15·00
I. C. Terne 14x20.....10·50 @ 12·50
I. C. Terne 20x28.....22·00 @ 23·00
I. C. Continuous.....23·00
Block Tin.—
Pig.....₱ lb 28c
Bars.....₱ lb 31c
Solder.—
A 1.....₱ lb 18c
Roofing.....₱ lb 17c
S. & Co.....₱ lb 23c
Lead.—Pig.....₱ lb 7½c.
Bar.....₱ lb 8½c
Copper.—
Ingot.....₱ lb @ 24c
Plantanes..... " @ 59c
Sheathing..... " @ 33c
Copper Drops..... " @ 33c
Sheets.. 6 to 9 lb..... " @ 38c
" 10 to 12 oz..... " @ 35c
Braziers.. 13 lb..... " @ 32c
Copper Bottoms..... " @ 35c
Zinc. Cast. 500 to 1000 lbs.....₱ lb 10½c
Case, 100 lbs..... " 11 c
Slab..... " 7½c
Brass.—Roll, No. 6 to 30.....₱ lb 30c
Roll, No. 30 to 38..... " 35c
Wire, No. 0 to 20..... " 35c
" 20 to 25..... " 40c
Babbit Metal.—Sellew & Co..... 35c
Allens'..... " 30c
Market..... " 12c
Antimony.....₱ lb 17c
Bismuth.....₱ lb $4 00
Nickel.....₱ lb $3 50
Sheet Iron.—Gen. Russia.....₱ lb 20c
Planished A.....₱ lb 14c
" B..... " 12½c

	Com. B.	Smooth Fin. S. L. U.	Smooth D Re'fd.
15 to 20	4 3-10	5 5-10	7 3-10
22 to 24	4 4-10	5 4-10	7 4-10
26	4 50	5 50	7 5-10
27	4 75	5 75	7 75

Galvanized Iron.—Full bundles.....dis 25 %
Nos. 18 to 20.....12c | No. 26.....14c
" 22 to 24.....13c | " 27.....15c
Bar Steel.—Silver, ₱ lb 16c; Crescent, 21c.
Iron Wire......dis 35 %
Enameled Ware.....dis 45 %
One Piece Corrugated Elbows......dis 10 %
Chalcoal Iron. | Russia Iron.
4½ inch.....₱ doz $2·50 | 4½ inch.....₱ doz $5·00
5 " " 3·50 | 5 " " 7·00
5½ " " 4·50 | 5½ " " 7·50
6 " " 5·25 | 6 " " 12·00
7 " " 6·50 | 7 " " 14·00
Leader Elbows, Flat Crimp Retinned or Galvanized.—Dis. 10 %
₱ doz. | ₱ doz
2-inch.....$1 75 | 2½-inch.....$2 75
3-inch.....2 25 | 3½-inch.....3 25
4-inch.....2 50 | 4½-inch.....3 50
Sheet Iron Bread Pans.....₱ lb 40c
American Broilers.....₱ doz. $3·50
Tinmen's Machines.....dis 5 %
Sad Irons.....₱ lb, 3½c
Brass Kettles.—Ansonia.....18c
Dog Irons.....4 c

PITTSBURGH.

The following are the Card rates of Lewis, Oliver & Phillips, H. B. Newhall, 11 Warren St., New York, Agent. Iron, standard list assorted sizes, for large orders, c, card rate, 2 % off net.
Flat Rail (1¼x¼), punched and coun'sunk..4·4c ₱ lb net
Iron Wedges.....4½c ₱ lb net
Norway Nail Rods.....9¼c ₱ lb net
Crow Bars (in ordering please state whether "Wedge" or "Pinch" point).....5c ₱ lb net
Beetle Rings.....8½c ₱ lb net
Fence Pickets—
⅝ round, bent to shape, 30c ₱ ft. of fence, less 15 % off net.
Discount off Standard List.
Carriage and Tire Bolts (new list).....70&10 % off net
Plow Bolts.....30, 10&5 % off net
Stove Bolts.....15 % off net
Machine and Square Head Bolts.....30&10 % off net
Coach and Lag Screws.....30&10 % off net
Bolt Ends.....35 % off net
Pat. Hot Pressed Square and Hexagon Nuts, small sizes, from 3-16 to ⅝ in.....7½c ₱ lb off net
Pat. Hot Pressed Square and Hexagon Nuts, large sizes, from 7-16 to 2 in.....6 c ₱ lb off net
Washers, all made from new band iron, small sizes, from 3-16 to ⅝ in.....9 c ₱ lb off net
Washers, all made from new band iron, large sizes, from 7-16 to 1⅛ in.....7 c ₱ lb off net
Nuts and Washers in 25 lb. boxes, 1c ₱ lb ex. Nuts and Washers in lots less than one keg each size, 1c ₱ lb ex. Nuts and Washers in 5 lb. boxes, 1½c. ₱ lb ex.
Harrow Teeth, in lots of 1 ton or more, packed in casks, 1 in. diam. 3¾c ₱ lb net; ⅞, ⅝ in. diam. 3¾c ₱ lb net; ⅝ in. diam. 4c ₱ lb net.
Patent Headed Harrow Teeth, packed in casks, ¼c ₱ lb ex
Skein Bolts, in bulk, in lots of 1 keg or more, ⅝ in. diam. 5½c ₱ lb net; 9-16 in. diam. 6½c ₱ lb net; ½ in. diam. 7½c ₱ lb net. 1c ₱ lb extra when less than 1 keg of each size is ordered.
Screw Hook-and-Eye Hinges, ⅞ to 1 in. diam. 9c ₱ lb net; ¾ in. diam. 10c ₱ lb net; ½ in. diam. 12 c ₱ lb net.
Screw and Strap Hinges, in lots of 100 pairs or more, 14 to 16 in. long, 5½c ₱ lb net; 8, 10 & 12 in. long, 6¾c ₱ lb net
Strap and T Hinges.....30 & 10 % off net, delivery as customary.
For purchases amounting to $250 between May 30th and December 31st, 5 % extra off.
Screw Hitching Rings.....$5 25 ₱ 100 net
Duck Nest Tuyere Irons.....$14 50 ₱ doz net
Cast Iron Washers.....₱ lb 4c net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long.....₱ lb 4 c net
1 to 2 in. diam. from 4 to 8 ft. long..... " 4¼c net
1 to 2 in. diam. from 1½ to 4 ft. long..... " 4½c net
⅞, ¾ and ⅝ in. diam. over 4 ft. long..... " 4¾c net
⅞, ¾ and ⅝ in. diam. from 1½ to 4 ft. long " 5¼c net
Bridge bolts with upset ends.....½c. ₱ lb extra
Wrought iron plates, punched.....5c. ₱ lb net

WAGON HARDWARE.

Wagon Box Strap Bolts—
10 in. long by 7-16 at Screw End, ₱ set of 8 bolts.. 55c
12 " ½ " " 8 " } 70c
10 " 9-16 " " 8 " }
12 " 9-16 " " 8 " } 90c
14 " 9-16 " " 8 " }
10 " ⅝ " " 8 " } $1 00
12 " ⅝ " " 8 " }
14 " ⅝ " " 8 " } 1 10
16 " ⅝ " " 8 " } 1 20
5c ₱ set for each additional inch over 14 in. All lengths made.
In ordering Box Strap Bolts please give diameter at Screw End.
Wagon Box Rods, narrow track, each.....18c
" " wide track, each.....20c
Single Tree Irons, ₱ set of four pieces.....38c
Wrought Iron Bolster Plates, 2¾ in. wide, ₱ set.....60c
" " 3 " " 65c
" " 3½ " " 70c
" " 3½ " " 75c
Wagon Brake Ratchets, each.....16½c
" " " finished with guard, each..45 c
Wrought Hammer Straps, heavy pattern, each.....16 c
" " " light " each.....13½c
" Rub Irons, each.....11 c
Stay Chain Hooks, each.....8 c
Double and Single Tree Clips, figure 1, each.....9 c
" " " " 2, each.....10 c
" " " " 3, each.....12 c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks and Clips, in lots of 50 sets.....dis 25 %
Wagon Box Staples, 1½ to 2½ in. to clinch, ₱ 1000 $11 00 net
" " " Bevel Box Iron, to rivet on, ₱ 1000 7 50 net
Neck Yoke Eyes, each.....4½c net
" " " with ⅝ rings, each.....7½c net
King Bolts, ⅝, 1, 1¼, and 1½ in. diam.....₱ lb 4½c net
Wagon Rivets, ex. large, flat, oval and steeple head, ⅛ in. diam. all lengths..... " 8½c net
Wagon Rivets, 3-16 in. diam., all lengths..... " 9½c net
" & Nails, in 5 lb paper boxes....₱ lb 1c extra
" in 25 lb wood " .... " ½c extra
Wagon and Hinge Nails, ⅛ in.....₱ lb 12 c net
" " 5-16 in..... " 10 c net
Double Tree Plates..... " 8½c net
Coupling " ..... " 5½c net
Tongue " ..... " 9 c net
Neck Yoke Plates..... " 11 c net
Tongue Cap Iron, 1¾, 2 & 2¾ in. wide, same price ₱ lb as Band Iron.
Wagon Chains, Stay Lock and Tongue, 5-16 in, ₱ lb 10½c net. ¼ in., 11½c. net

DETROIT.

(Reported by Messrs. Jewett & Root.)

Tin Plate.—Best Charcoal
IC. 10x14.....$11 50
IX, 10x14.....14 25
XX, 10x14.....17 00
IC. 12x12.....12 00
IX. 12x12.....14 75
IC. 14x20.....14 50
IX. 14x20.....16 25
XX. 14x20.....18 00
XXX. 14x20.....20 75
XXXX. 14x20.....23 50
DC. 100 Plate.....11 00
DX, " 13 75
DXX, " 16 50
DXXX " 19 25
DXXXX 100 Plate..22 00
IX, 14x14.....23 25
IC, 10x14 W.....11 00
IX. 10x14 W.....14 75
Roofing Tin.—Best Char.
IC, Terne, 14x20.....$10 50
IX, " 14x20.....13 25
IC, Terne, 20x28.....22 00
IX, " 20x28.....27 00
Coke Tin.—
IC, 10x14 Coke.....$10 00
IX, 10x14, Coke 12 75
IC, 14x20, " 11 00
Pig Tin.—
Large Pigs.....29c
Small Pigs.....29½c
Bars.....30c
Solder.—No. 1.....16c
No. 2.....15c
Sheet Zinc.—
In any quantity.....10½c
Bright Wire.
60 lbs. in bdl....dis 40 %
Copper.—
Sheathing.....31c
Copper Bottoms....32c
Planished Copper.—
Sheathing, 14x48.....38c
Boiler Size, No. 7.....40c
" " No. 8.....40c
" " No. 9.....40c
Sheet Iron.—
No. 18 Am. Com.....4 40
No. 24 Am. Com.....4 60
No. 26 Am. Com.....4 80
Patent Planished Russia, Nos. 24, 25 and 26....14c
Genuine Russia, No. 9, 10, 11 and 12.....18c
Broken bdls. ½c. extra.
W. D. WOOD'S & CO. S SHEET IRON.—
Nos. 15 to 20 Smooth $5 10
" 21 to 24..... 5 30
" 25 & 26..... 5 50
" 21 to 24 Char'l.. 6 80
" 25 & 26 " .. 7 00

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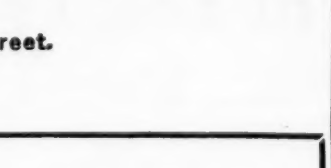

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Geo. Dunbar & Co., Boston, Mass.
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Augers.—Watrous Ship.....dis 10 %
L'Hommedieu Ship.....dis 15 %
Axes.—Forester's Favorite, Bronzed.....$12 00
Blue Jackets, blue.....11 5
Excelsior, Black.....11 00
Chopper's Pride, Bronzed.....10 50
Red Cross, Red.....10 00
Red Cross, Handled.....12 50
Boy's Handled Blue Jackets.....12 00
Axe Handles.—Wadleigh's Oak—
A (Extra) $2·50. B (No. 1) $2·00. C (No. 2) $1·50 ₩ doz
Bells, Sleigh—
Fancy Body, Patent Leather, Cloth Bound, White Metal, 30, No. 1.....$1·70
Fancy Body, Patent Leather, Cloth Bound, White Metal, 36, No. 1.....1·80
Fancy Body, Patent Leather, Leather Bound, Extra Tinned, 30, No. 1.....·88
Fancy Body, Patent Leather, Leather Bound, Extra Tinned, 36, No. 1.....2·50
Fancy Body, Patent Leather, Leather Bound, Silver Plated, 30, No. 1.....3·38
Fancy Body, Patent Leather, Leather Bound, Silver Plated, 36, No. 1.....3·50
Shaft, Strap, White Metal, House Bells, extra, 6, No. 1.....per pair, 50c.
Common, 6, No. 1.....45c.
Blind Hinges.—
Orr or Washburn's.....per hundred sets $9 50
Blind Fasts.—
Orr or Washburn's.....per hundred set $6 00
Bolts.—Carriage, Phila., "Girard Works.....dis 50&10 %
Borax.—Best Refined.....₩ lb 15c
Borers.—Angle, Backus'.....dis 30 %
Boring Machines.—Angle.....each $4 75
Common, Snell's quality.....each 3 75
Braces.—Barber's.....dis 40&5 %
Backus'.....dis 50 %
Spofford's.....dis 50 %
Amlaon.....dis 50 %
Brackets.—Star Bronzed.....dis 50&10 %
Star Japanned.....dis 60&10 %
Store Shelf.....dis 35 %
Brass Faucets.—L. F. & C.....dis 25 %
Butts.—Union Drilled Loose Joint.....dis 45&10 %
" " Wire Fast Joint.....dis 25&10 %
" " Acorn Loose Joint...dis 40&10 %
Brass Butts.....dis 30 %
Wrought Table Butts and Back Flaps.....dis 50 %
Wrought Narrow Butts.....dis 30 %
Can Openers—Sprague's.....dis 50 %
No. 1, Iron Handle.....$4·00
No. 2, Wood Handle.....4·50
Cartridges.—" U. S. Cartridge Co."....dis 50&10 %
Chisels.—"Buck Bros.' Sha's \Goods.....add 20 @ 22½ %
Socket.....add 22½ @ 25 %
Churns.—Lightning—
Redheffer patent.....3 4 5 6 gall
per doz $22 00 $27 00 $31 50 $36 00
Coal Hods.....dis 35 %
Fancy Japanned, No. 4, 15 in., $8·00; 5, 16 in., $9·00; 6, 17 in., $10·00.
Fancy Galvanized, No. 4, 15 in., $11·50; 5, 16 in., $13·00; 6, 17 in., $14·00.
Perfection, Jap'd, No. 4, 15 in., $12·00; 5, 1 in., $13·00; 6, 17 in., $14·00.
Perfection, Galv'd, No. 4, 15 in., $15·00; 5, 16 in., $16·00; 6, 17 in., $17·00.
Morning Glory, Jap'd, No. 4, 15 in., $12·00; 5, 16 in., $13·00; 6, 17 in., $14·00.
Morning Glory, Galv'd, No. 4, 15 in., $15·00; No. 5, 16 in., $16·00. No. 6, 17 in., $17·00.
Compasses and Dividers.—Bemis'.....dis 35 %
P. S. & W.....dis 25 %
Cordage.—Manila (usual trade dis.).....₩ lb. 15c
American Tarred Hemp Lath Yarn.....₩ lb. 10c
Corn Hooks.....per doz $2·75
Cow Ties.....dis 10 %
No. 30, Open Ring, 3 foot, No. 6, with Toggle.....$3·70
No. 35, " 3 " No. 6, " Snap.....3·90
No. 40, " 3½ " No. 5, " Toggle.....4·23
No. 45, " 3½ " No. 5, " Snap.....4·40
No. 50, " 4 " No. 4, " Toggle.....4·85
No. 55, " 4 " No. 6, " Snap.....5·00
No. 60, " 4½ " No. 5, " Toggle.....5·60
No. 65, " 4½ " No. 5, " Snap.....5·80
Crow Bars.—Iron. Steel Points.....₩ lb. 5½c
" Sweet" Steel Bars.....₩ lb 11c
Brown's Steel Bars.....₩ lb 10c
K. P. & Co. Extra Drill Steel.....₩ lb 15c
Dividers.—Cook's Nickel Plated.....dis 15 %
Door Springs.—Stimson's Patent.—
No. 7, Light inside doors, $12·00.....dis 25 %
No. 8, " outside " $15·00.....dis 25 %
Torrey's.....$4·00
Egg Beaters.—Lightning, Redheffer pat. 1 qt., 2 qts.
per doz $8 00 $12 00
Emery.—Alden.....₩ lb 6½c
Wellington Mills.....₩ lb 10c
Files.—Earl Smith & Co.'s English.....$5 to £ gold
American.....$5 to £ currency, less 12½ %
Nicholson.....new net list
Wheeler, Madden & Clemson.....25 net
Stubb's Tapers, genuine, 3 in., $1·50; 3½, $1·62; 4, $1·88; 4½, $2·13; 5, $2·50.
Funnel Irons.—$2·50 2·50 2·50 3·25 per doz
5, 5½, 6, 7 inch.
Deep Flange.—$3·50 4·25 4·00
5, 5½, 6 inch.
Hammers.—Maydole.....dis 5 %
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1¼, $8·75
" " " " bell face, No. 1, $11; 1¼, $9·75.
Hangers & Rollers.—Novelty.....dis 30 %
Anti-Friction.....$1 25 per pair—dis 30 %
Hatchets.—Underhill Edge Tool Co.....dis 15 %
C. F. Dowse, warranted Cast Steel—
Shingling.....0, $4·75; 1, $5·25; 2, $5·75
Claw.....1, 5·75; 2, 6·25
Lathing.....1, $5·50

Axe Pattern.....1, $1·00; 2, 1·50
Broad....0, $5·75; 1, $6·50; 2, $7·50; 3, $9·25; 4, $10·75; 5, $12·75; 6, $14·75.
Hinges.—Strap and T, Stanley Works.....dis 35&10 %
Plate, Loose and Fast Joint.....₩ lb 6c
Wrought Screw Hook.....₩ lb 6½c
Knobs.—Young's imp. Silverd Glass.....dis 45 %
Lanterns.—Tubular No. 0.....$9·50
Guarded. No. 74, (with kerosene oil and candle burners).....6·25
Lead.—Sheet and Pipe.....9c—less 10 %
Locks.—Norwalk Lock Co.....dis 45&5 %
Mattocks.—
K. P. & Co.. axe finish, long cutter.....$13 00—dis 10 %
Short cutter.....12 75—dis 10 %
Meat Cutters.—" Miles's" Challenge.....dis. 20 %
No. 1, $22·00; 2, $30·00; 3, $40·00.
Metal.—Babbitt. No. 1, 35c; 2, 25c; 3, 16c; 4, 15c ₩ lb
Nails.—10d and larger—dis 15c 100 keg lots.....$3 50
Nail Pullers.—Little Giant—Small.....per doz., $22·00
Little Giant—Large.....30·00
Padlocks.—Wilcox.....dis 45&5 %
All Brass, 2¼ inch. 2 keys. job lot.....$9 00
Paper.—Tar'd Sheathing.....₩ lb 2 c
Dry Sheathing.....3½c
" " "Beaver Brand" Rosin Sized.. 4½c
Tar'd " " " 3½c
Felt " " " 4½c
Picks.—
K. P. & Co. Axe Finish..₩ doz 5 to 6 $8·50; 6 to 7 $9·00
" " Solid Eyes.....5 to 6 6 to 7
$9 00 $9 50
Pins.—Universal Hat and Coat all wood—
2 in.....₩ gross $2 50; 3 in., 3 50; 4 in., 4 50—dis 15 %
Potato Digger.—
" Partridge," 6 square tine.....₩ doz $12 00
Shumway & Co., 6 round tine.....₩ doz 9 00
Pulleys.—Axle .....1¼ No. 15, 31c; 1¼ No. 18, 33c; 1¾ No. 20, 42c; 2 No. 29, 49c.
Nashua, Bronzed Face.....1¼, 80c; 2, 90c
Steel Axle " " .....2, $1·00
Pulley Blocks.—" Best Boston Make".....net
Common Strapped Blocks—
4 5 6 7 inch.
Single, 75c. 88c. $1·00 $1·13 each.
Double, $1·00 1·13 1·25 1·60 "
Inside Iron Strapped Blocks—
4 5 6 7 8 10 inch.
Single, $1·00 1·13 1·25 2·00 2·25 1·75 each.
Double, 1·88 2·00 2·63 3·63 4·00 5·00 "
Inside Iron Strapped Blocks, with Patent Roller Bushings—
5 6 7 8 9 10 inch.
Single, $1·25 1·50 1·65 2·50 2·65 3·50 each.
Double. 2·50 3·00 3·38 4·63 5·00 6·50 "
Plated Ware.—Rogers Bros.....dis 50 %
Plumb & Levels.—" Davis" Pat. Adjustable—
No. 1, Iron and Wood Center Levels.....dis 50 %
No. 2, " Quality Levels.....dis 60&10 %
No. 3, Iron Pocket " .....dis 35 %
No. 4, Level and Plumb Glasses.....dis 60&10 %
No. 5, Iron Pocket Levels, per square and straight edge.....dis 50&10 %
No. 6, Improved Iron Bench Planes.....dis 50&10 %
Pocket Knives.—Conn. Cutlery Co.....new net list
American Shear Co.....dis 33⅓ %
Rail Barn Door.—For Novelty and Anti-Friction Hangers.....per foot 7c.. dis 30 %
Rivets.—Black.....dis 25 %
Carriage, oval head, Nos. 6, 4, 5, 6, 7, 8.
13 13 14 14 15 16c ₩ lb net
Rubber Moldings.—" Harmon's".....dis 10 %
No. 2, for Windows.....per foot, 5c
No. 3, for Doors.....per foot. 10c
No. 4, " .....per foot. 12c
Sad Irons.—Bliss & Drake.....₩ lb 8½
Sand Paper—0 to 2, $4·25; 2 to 3, $4·75.....dis 10 %
Saws.—*Hand and Panel*—
Wheeler, Madden & Clemson's, same list as " Diston's".....dis. 15 %
Diston's.....dis. 12½ %
Cross Cut—
Wheeler, Madden & Clemson X Cuts.....per ft., 8½c
" " " "Star" X Cuts. " 60c
" " " Champion X Cut. " 50c
" " " One Man X Cut..each, $2·25
Boynton's genuine Lightning X Cut.....per ft., 60c
" " " One Man X Cut..each, $2·25
Circular—Wheeler, Madden & Clemson's.....dis. 25 %
" Mill—.....dis. 25 %
Screws.—American Screw Co.....revised list dis 62½ %
Aiken's.....dis 60&10 %
Scythe Stones.—
" Willoughby Lake," first quality.....₩ gross $6·50
" " second quality..... " 3·00
Shovels.—O. Ames.....new list dis 12½ %
M. B. & D.....new list dis 12½ %
Snow, Malleable Iron Tip, D Handle—Agents for New England.....$6·50
Snow, Malleable Iron Tip, long Handle—Agents for New England.....5·50
Sifters.—Coal, Rice, &c.....$12 00
Spading Forks.—M. & E.....dis 25 %
Stone Pickers.—" Partridge," original...₩ doz $15 00
Tools.—Aiken's Pattern, 20 in set; Parr's..$8·00 per doz
Traps.—Oneida.....dis 20 %
Blake's.....dis 30 %
Vises.—K. P. & Co.'s Solid Box. Blacksmith.....₩ lb 13c
Parker's Parallel.....dis 10 %
Backus.....dis 25 %
" Howards." Parallel.....dis 20 %
Wardrobe Hooks.—Wire to drive.....₩ gross $1 00
Weather Strips.—" Harmon's".....per doz $5, d.c 10 %
Weights.—Window Weights.....₩ lb 2c
Wedges—Axe.....₩ doz 38c
Wire.—
Eureka, in spools, No. 28 to 40 assorted...₩ gross $3 50
Wire Netting.—Clinton Wire Cloth Co., Green, Drab or Black.....₩ ft 5½c
Wrenches.—Genuine Wrenches, G. A. Coes..dis 40&5 %
Walton.....dis 50 %
Wringers.—
Novelty and Universal } Tub No. 2 } .....Less than 2 doz, $64 00
.....2 doz or more, 62 00
Bench A.... less than 2 doz $82 00; 2 doz or more $80 00
" B.... " " " 90 00 " " 88 00
" C.... " " " 108 00 " " 106 00
Eureka.....per doz $58 00
Withington, Cooley & Co.—
Hoes, Rakes, Forks, &c.....dis 33⅓ %

Boston Metal Market.

(Corrected by Fuller, Dana & Fitz.)

Tin Plates.—₩ box
I. C. Char. 10x14 @ $9·25
I. C. Coke 10x14.. 9 00
Char. Roof. IC, 14x20. 10 75
Coke " IC, 14x20, 10 25
Pig Tin.— ₩ lb
Banca.....31c
Straits.....24½c
English.....24½c
Zinc.—Sheet..₩ lb 10½c
Iron.—Sheet Iron, Russia.....17c
Sheet Iron, English.....5
" " American Refined.....5½c
" " Galvanized.....10c
Plate Iron.....5½c
Swedish and Norway Bar Iron gold.....₩ ton, $120 00
" " " Shapes gold.....127 50
Norway Nail Rods, first quality, gold.....140 00
" " second " " 132 50
Best Refined Bar Iron.....62 50
The "Burden Best" Iron.....100 00
American Pig Iron, Foundry, No. 1 X.....31 00
" " " No. 2 X.....29 00
" " Gray Forge.....27 00
Scotch Pig Iron.....₩ ton 36 00 @ 39 00
Wrought Scrap Iron.....34 00
Steel.—₩ lb
Eng. Tool.....19c
American Tool.....14½c
" Mach.....10c
Pessemer.....7½c
Copper.— ₩ lb
Sheathing.....30c
Bolt.....32c
Ingot.....32c
Lead.— ₩ lb
Pig.....7½c
Sheet & Pipe.....8½c
Spelter......₩ lb 7½c
Antimony.....₩ lb 15c

ST. LOUIS.

Corrected weekly by Semple, Birge & Co.

Apple Parers.—Conqueror.....₩ doz, $7 75
Hudson's Rotary.....7 75
Axes.—Wm. Mann's, Red Warrior.....₩ doz $11 50
Wm. Mann's, W. Stewart's.....11 00
" C. Marshall.....10 50
" Handled.....$5 extra
" Double Bitted.....2 50
H. L. B. & Co.'s, L. & Co.....11 50
" Pioneer.....12 00
" James & Co.....11 00
Hunt's.....12 00
Axles.—"Jones, Henry & Co.'s" Patent Lubricating, Half Patent, Swelled Taper, Plain Taper and Concord Axles.....dis 10 & 5 %
Common Axles (Pat. Lubricating), 1¼ inch and upward.....₩ lb. 6½c.
do. less than 1¼ inch.....7 c.
Bellows.—Best St. Louis make..6c ₩ in. dis 30&2½ %
Bells.—Troy, Church, School and Farm Bells..₩ lb 44c
"Improved Amalgam Bronzed." 15 in $3·00;
17 in., $4·00; 19 in., $6·00.....dis 10 %
Belting.—"Boston Belting Co.'s Rubber..dis 30&7½ %
"Bradford & Sharp's" Oak-Tanned Leather....dis 30 %
Bolts.—Arms, Bell & Co.'s Carriage & Tire..dis 70&10 %
Arms, Bell & Co.'s Machine.....dis 30&10 %
Butts.—Western Butt Co.'s new list—
Narrow Fast Joint.....dis 25&10 %
Broad Fast Joint.....dis 35&10 %
" Loose " .....dis 45&10 %
Reversible.....dis 40&10 %
" Japanned and Silver Tipped.....dis 40&10 %
Loose Joint " Acorn " " " .....dis 40&10 %
Wheeling Hinge Co.'s W't Fast Joint Nar.....dis 30 %
" " " Broad.....dis 35 %
" " Loose Joint.....dis 35 %
" " Reversible.....dis 35 %
" " Table & B'k Flaps.....30 %
Churns.—Julian, No. 2, $7·00; No. 3, $7·50; No. 4, $8·50.....dis 20 %
Cider Mills.
American Senior, $40·00; Am. Junior, $25·00.....dis 15 %
Corn Knives.—Dunn Edge Tool Co.'s Clip..5 75
Seymour Mfg. Co.'s Solid Steel Back.....5 00
Corn Shellers.—Sandwich Mfg. Co.'s—
Power Shellers.....dis 10 %
Hand Shellers.....Special rates
Corn Planters.—Challenge, Horse.....$49.00 net
St. Louis, Hand.....per doz $15·00
Cotton Gins.—Dubois Patent.....dis 10 %
Crow Bars.—Steel Pointed.....₩ lb 6½c
Drag Saw Machines.—
Culver's Iron Drag Saw.....dis 10 %
Robinson's Patent Sweepstakes Drag Saw.....dis 10 %
Fanning Mills.—Nash & Cutt's.....dis 15 %
Feed Cutters.—Improved Burdick National...dis 15 %
Sanford No. 1, $13 00; No. 2, $8 75.....net
Files.—Black Diamond, Mill.....$5·00 £ currency.
" Bastard.....5·00 £ currency.
" Taper.....5·00 £ currency.
Forges.—Keystone Portable Forge Co.'s.....dis 12½ %
Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks....dis 25½ %
" Handled Hoes.....dis 50½ %

Garden Seed Drills and Wheel Hoes.
Allen's Double Wheel Hoe.....dis
" Planet Drill, Nos. 2 and 3.....dis
" Combined Drill and Wheel Hoe.....dis
Grinding Mills.—French Burr Mills.....net
Challenge Feed Mills.....dis
Sedgebeer's Nonpareil Mills.....dis
Osage Corn and Cob Mill.....dis
Hammers.—Masons' Hammers.....₩ lb 20c
Smiths' Hand.....20c
Handles.—No. 1 Fork, Hoe and Rake.....dis 20 %
No. 2 Fork, Hoe and Rake.....dis 40 %
Harrow Teeth.—1 inch iron.....₩ lb 4½c
⅞ and ¾ inch iron.....4½c
Barbed or Headed.....½c extra
Hay and Cotton Presses.—
Dederick's Railroad.....dis 5 %
" Perpetual.....net
Hay Knives.—
Dunn Edge Tool Co.'s.....₩ doz $15 00—dis 15&5 %
Lightning (Weymouth's Patent).....₩ doz $20 00
Hinges.—
Wheeling Hinge Co.'s Strap & T.....dis 33⅓&10 %
Horse Hay Fork.—Nellis' Harpoon.....dis 25 %
Horse Nails.—National Patent Pointed.....20c rates
National Patent Pointed, extra finished.....25c "
Horse Powers.—Pitts or Carey's Patent.....dis 10 %
Wheeler's Railway.....dis 10 %
Sandwich Lever.....dis 10 %
Horse Rasps.—Heller Bros.....dis 45 %
" Black Diamond ".....$6·00 to the £ currency
Horse Shoes.—
Rhode Island (Perkin's Pattern).....₩ keg, $6 25
" Mule..... " 7 25
" Trotting Shoes..... " 8 75
Tredegar Horse.....per keg $6 25
" Mule.....per keg 7 75
Hose.—
Boston Belting Co.'s Rubber Medium Sizes..dis 30&10 %
" " Small Sizes, Hydrant.....dis 40 %
Ice Tools.—W. T. Wood & Co.'s Saws.....new list net
W. T. Wood & Co.'s Chest Hatchets.....new list net
" " Axes.....new list net
" " Loading Tongs.....new list net
" " Medium, Small and Family Tongs.....new list net
" " Chisels, Hooks and Grapples.....new list net
Lawn Mowers.—Archimedean.....dis 20&5 %
Charter Oak.....dis 30 %
Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks....₩ doz $13 00 @ 18 5
" " Grub Hoes, oval eye..... " 10 00 @ 11 50
Money Drawers.—
Pierpont & Co.'s Excelsior.....per doz $40·00 net
Nails.—Wheeling.....$3 25 rates
Packing.—Boston Belting Co.'s Rubber, Plain..dis 30 %
Boston Belting Co.'s Rubber, Pure.....dis 25&5 %
" " No. 2 Plain.....dis 40 %
" " Round and Square....dis 10&10 %
Picks.—Klein, Logan & Co.'s Railroad and Clay.....₩ doz $9 30 @ 11 00
Klein, Logan & Co.'s Coal..... " 7 45 @ 8 40
" " Pick..... " 12 60 @ 15 20
" " Stone..... " 14 40 @ 14 90
" " Tamping..... " 14 75 @ 15 25
" " Miners' Drifting..... " 10 25 @ 12 80
Plows.—Avery's Cast and Steel.....dis 15 %
Collins Cast Cast Steel.....new list net
Perkin Steel.....new list net
Post Hole Augers.—Clark's Patent—
No. 1, ₩ doz. $27; No. 2, $30; No. 3, $32.....dis 20 %
Pulleys.—5 inch.....per doz $4·25 net
4 inch.....per doz 3·25 net
Nellis' Patent.....new list dis 15 %
Pumps.
St. Louis, Farm, Patent Metal Lined...new list dis 50 %
Rakes.—Paddock's Premium Sulky.....$30 00 net
St. Louis Revolving 14 tooth.....5 50 net
" " 16 " .....6 00 net
" Hand Hay Rake.....dis 10 %
Reaper Knives and Sections.—
Geo. Barnes & Co.'s Knives.....dis 40 %
" " Sections.....dis 40 %
Road Scrapers.—Steel.....dis 25 %
Cast Iron.....dis 10&2½ %
Sad Irons.—Monitor Brand, Silver Polished..₩ lb 14c
Sash Weights.—Standard Solid Eyes.....₩ lb 3½ c
Saws.—Curtis & Co.....dis 10 %
Scythes.—Dunn Edge Tool Co.'s....new list dis 20&2½ %
Scythe Stones.—No. 1 Ind'n Pond ₩ gr's, $7 00
Extra Indian Pond " 7 50
Premium " 10 50 } dis 25
Diamond Grit " 13 00
Shovels and Spades.—Myers & Armor.....dis 15 %
O. Ames & Son.....dis 5 %
Grain Scoops, (Pat. Corrugated Straps) M. & A. dis 15 %
" " " T. Rowland's dis 15 %
" " " O. Ames & Son dis 5 %
Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished.....₩ lb 15c
Solid Cast Steel..... " 25c
Spaths and Cradles.—Seymour Mfg. Co.'s..dis 20 %
Sorghum Machinery.—Ben Cane Mills.....dis 15 %
Scantlin's Seamless Evaporators.....dis 10 %
Springs.—Cleveland Spring Co.'s—
Carriage and Express.....dis 12½ %
Blue Seat Springs.....dis 15 %
Thimble Skeins.—Pump & Skein Co.'s.....dis 60 %
Vises.—Solid Box.....₩ lb 16c
Wilson Mfg. Co.'s.....dis 15 %
Wheelbarrows.—Railroad & Garden....new list net
Wrenches.—Coes' Genuine.....dis 25&5 %
Coes' Pattern.....dis 50&5
Wagons.—Whitewater Farm Wagons—
Thimble Skein.....No. 3, 3-6; 3½, $80 3½, $81
Iron Axle.....No. 1¼, $69; 1⅜, $83 1⅜, $90

St. Louis Metal Market.

(Corrected Weekly by Messrs. R. Sellew & Co.)

Tin Plate.

IC, 10x14, Char.	11 00	IX, continuous, 20 in. x 200 ft.	
IX, 10x14, "	13 50	IC, 10x14, best Coke	$10 00
IC, 12x12, "	11 50	IC, 10x14, good Coke	9 50
IX, 12x12, "	14 00	IC, 10x20, Terne	10 50
IC, 14x20, "	12 00	IX, 14x20, "	13 00
IX, 14x20, "	14 50	IC, 20x28, "	22 00
IC, 14x20, Terne	10 50	IX, 20x28, "	27 00
IX, 14x20, "	13 00	IC, 14x20, Coke Lead.	9 50
IC, 20x28, "	22 00	IC, 10x14, punch'd for Safes	2 50
IX 20x28, "	27 00		
IC, continuous 20 in. x 200 ft			

Block Tin.

Large Pigs	27c	Bars	27c
Small "	28c		

Sheet Zinc.

Casks	₩ lb 10c	Sheet	₩ lb 10½c

Solder.

No. 1, Refined, in bars or pipe	16c
No. 2, " " "	15c
Pig Lead	7c

Sheet Copper—48 to 100 lbs. Sheets 30x60.....31c
14 to 16 lbs., Sheets 30x60.....31c
10 to 12 lbs., " and 30x52.....32c
6 to 9 lbs., " " 32c
Tinned, 14 and 16 oz. 14x48.....30c
Planished, 14 and 16 oz. 14x48.....38c
" No. 7, 8 and 9.....40c
Copper Bottoms.....43c

Sheet Iron.

	Com'n.	Sm'th.	Char'l.	Jun'ts.
No. 16 to 20	4 c	4¼c	6¼c	7¾c
No. 22 to 24	4 c	4¼c	6¼c	7¾c
No. 26	4¼c	5 c	6¼c	7¾c
No. 27	4¼c	5¼c	6¼c	8 c

Galvanized Iron.....dis 30 %
Iron Rivets.....dis 25 %
Iron Wire.....dis 47½ %
Coppered Market Wire.....dis 45½ %
Copper Rivets and Burs.....dis 20 %
Russia Iron.—Nos. 9, 10, 11 and 12. ₩ lb.....17c
No. 1 stained.....15c
Imitation Russia, ₩ lb.....14c
Retinned Stamped Ware.....dis 25 %

CHICAGO.

(Reported by Frank Sturges & Co., 74, 76 & 78 Lake St.)

Tin Plate.—

10x14, IC, Ch'l. Good	8	14x20, IX, Ch'l Best	$15 00
10x14, IC, " Best.	11 50	14x20, IXX, "	17 50
10x14 IX, " "	13 00	14x20, IXXX, "	20 00
12x12, IC, " "	12 00	DC, 100 Plate, "	11 50
14x12, IX, " "	14 50	DX, "	14 00
14x20, IC, " "	13 50	DXX, "	16 00
Roofing IC, Charcoal, Best		DXXX, "	19 00
Roofing IX, Charcoal "			11 00
20x28, IC, Charcoal Roofing, Com			18 50
20x28, IC, " Fair			21 00
20x28, IC, " Best			22 00
20x28, IX, " "			26 50
10x14, IC, Coke Plates		10 00 @ 10 50	
14x20, IC, "		10 50 @ 11 00	
10x20, IC, "		16 50	

Block Tin.—

Large Pigs	26c	Bars	28c
Small "	27c	Straits, 2c. higher.	

Zinc.—Sheet, 500 to 1000 lb. Casks.....10½c
Loose Sheets.....11c
Slab Zinc or Spelter.....7¾ to 8c
Copper.—Bottoms.....34c
Sheathing.....3 c
Planished.....39c
" Boiler lengths.....41c
Ingot.....24c to 25c
Bolt.....35c

Braziers' Sheets.—

30x60, 6 to 8 lbs.	₩ lb 25c	30x60, 15 to 100 lbs.	₩ lb 31c
30x60, 10 & 12 lbs.	" 28c		

Solder.—F. S. & Co.'s make.
Best Fine.....30c
No. 1.....28c
Roofing.....17c
Braziers' or Spelter Solder.....32c to 35c
Antimony.....17c
Babbit Metal—F. S. & Co.'s.....18c
No. 2.....14c

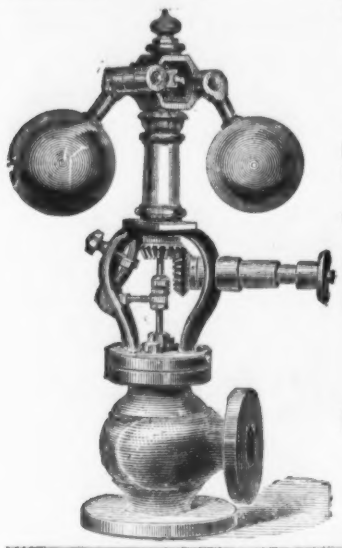
Sheet Iron.—

	Common.	Smooth Com.	Smooth Charcoal.	Smooth Junists.
No. 24	4¼c	5¼c	6¾c	8¾c
25 & 26	4¾c	5¾c	7 c	9 c
27	4¾c	6 c	7¼c	9¼c

Galvanized Iron.....dis 25 %

No. 16 to 20	12c	No. 27	13c
21 to 24	12c	28	13c
25 & 26	14c		

Russia Iron.—Perfect.....19c | No. 1 Stained. In sheets, 1c. higher.
American Russia.—A.....14c | B.....11c
In sheets, 1c higher.
Lead.—Pig.....7¾c | Lead Pipe, in full coils 8¼c
Bar.....8¾c | Lead Pipe, when cut. 9¼c
Wire—Bright.....dis 35 %
Coppered.....dis 30 %



TO ALL WHO USE STEAM-POWER!

We will put our Governor on any Engine, and guarantee it to prove itself superior to all others.

If, after a fair trial, it does not, we will take it off at our own expense.

Shive Governor Co

BETHLEHEM, PA.

ALSO,

SHIVE'S PATENT WATCHMAN'S CLOCK AND DETECTOR.

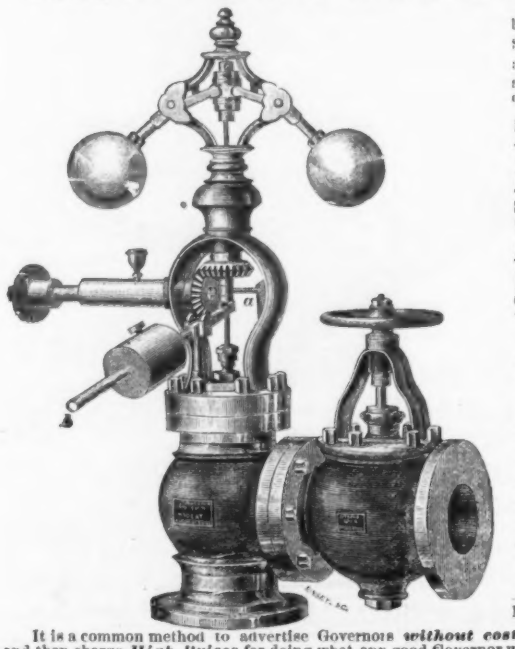
The Best and Cheapest Watcher of the Watchman made

PRICE ONLY $15.

Circulars sent free.

February 10, 1875. REDUCED PRICE LIST OF THE

JUDSON PATENT IMPROVED GOVERNORS.



☞ When Governors are ordered, be particular and say Governor with Stop Valve, or without Stop Valve; and either Black, Finished or Portable, as you may require, and with or without Lever Attachment.

For dimensions and other particulars send for Illustrated List.

Capacity of Valve or Diameter of Steam Pipe in inches.	Price, Black.	Price, Bright Finish.	Price, Portable.	Price of Lever Attachment for altering speed.	Price of Stop Valve.
⅛	18·00	20·00	17·00	..	..
¼	20·00	22·00	19·00	..	..
1	24·00	27·00	22·00	2·00	5·25
1¼	29·00	32·00	27·00	2·25	6·60
1½	34·00	38·00	31·00	2·50	8·50
2	41·00	46·00	58·00	2·75	11·50
2½	47·00	54·00	..	3·25	16·00
2⅝	50·00	57·00	47·00	3·50	17·00
2¾	55·00	62·00	No Larger Portable made than 2⅝ in.	3·75	19·00
3	62·00	70·00		4·25	22·00
3⅛	71·00	80·00		4·50	27·00
4	81·00	92·00		5·00	32·00
4⅛	91·00	103·00		5·50	37·00
5	102·00	114·00		6·00	42·00
5⅛	116·00	129·00		6·50	48·00
6	134·00	148·00		7·00	55·00
7	160·00	176·00		8·00	69·00
8	199·00	219·00		9·00	83·00
9	230·00	255·00		10·00	..

No Charge for Boxing & Cartage.

It is a common method to advertise Governors ***without cost***, unless satisfactory to the customer, and then charge ***High Prices*** for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than those shown in the above list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

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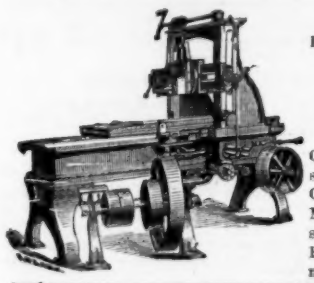

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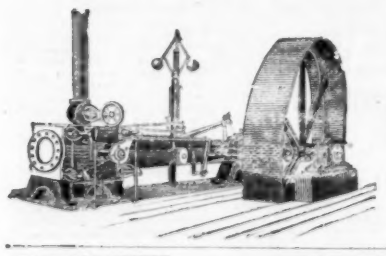

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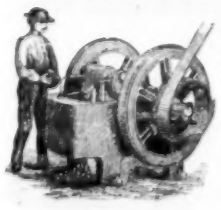

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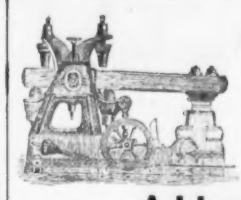

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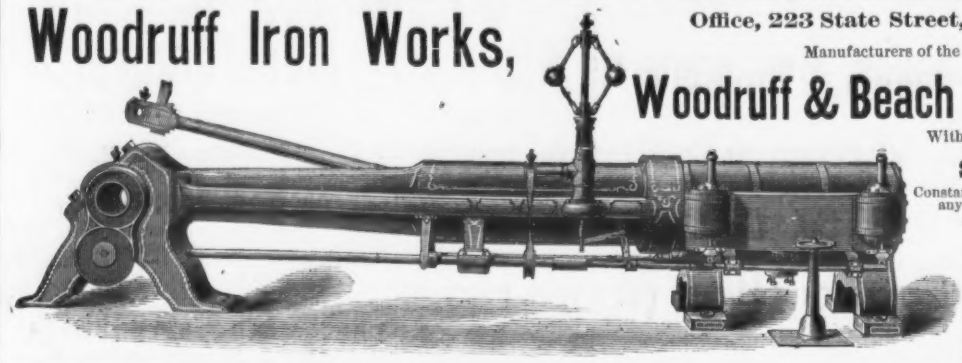

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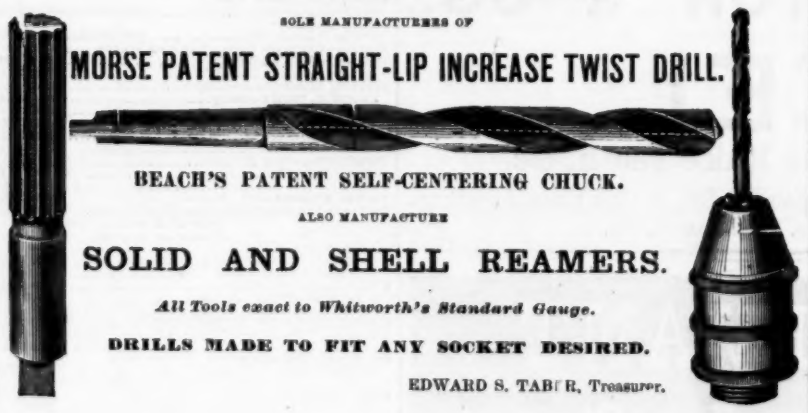

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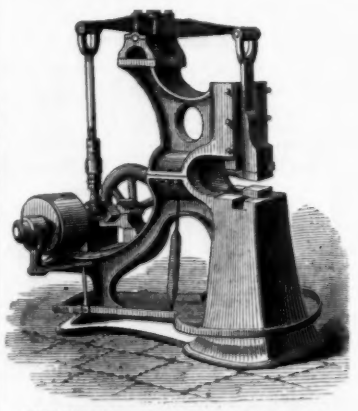

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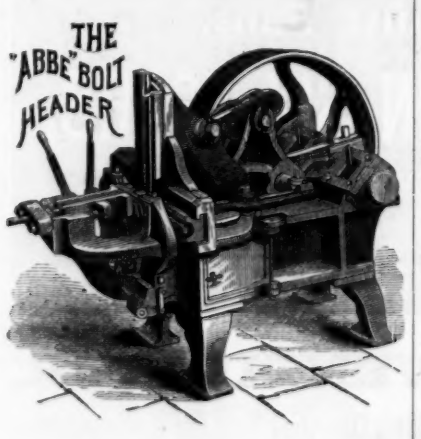

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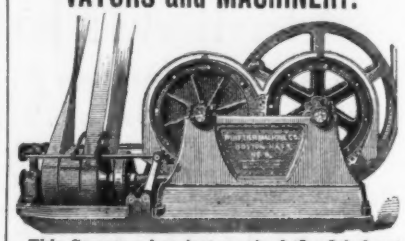

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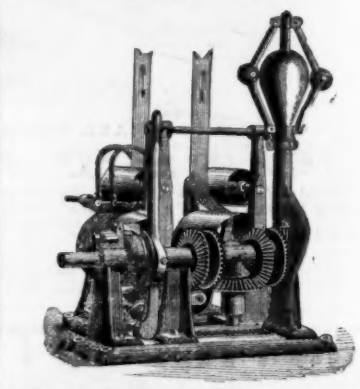

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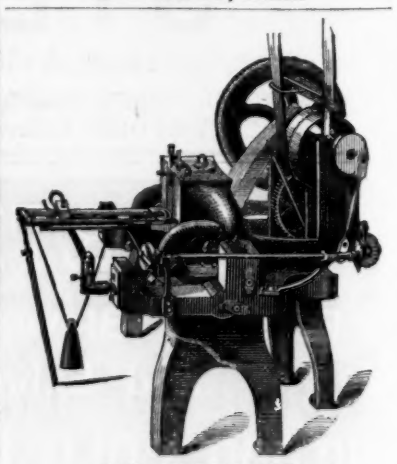

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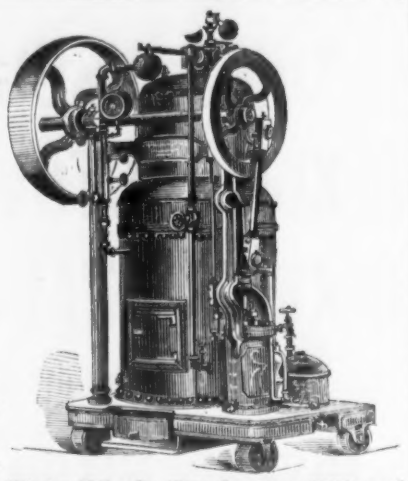

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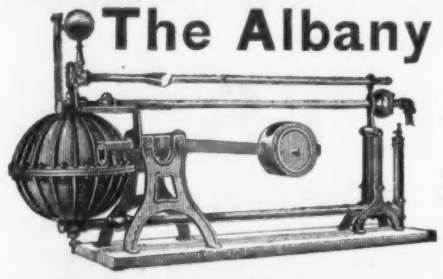

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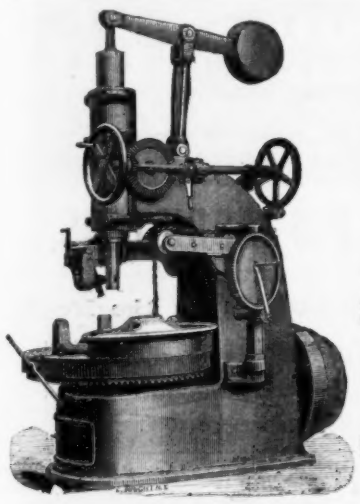

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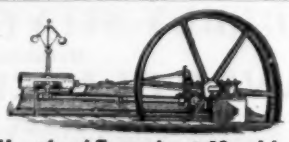

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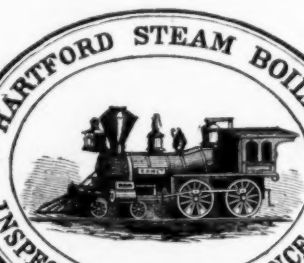

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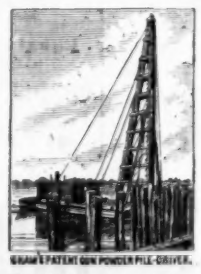

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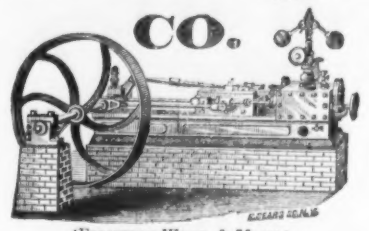

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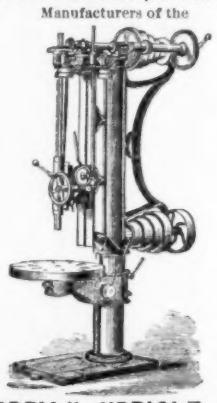
Manufacturers of the



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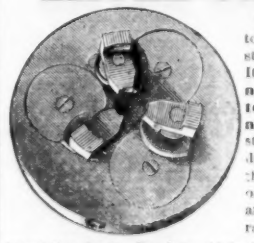

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BRASS CASTINGS, 21 to 35c ℔ lb. | **INGOT BRASS,** 19 to 30c ℔ lb. | **BRASS TURNINGS AND OLD METALS WANTED.**

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WM. & HARVEY ROWLAND,

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P. O. Address: Frankford, Philad'a. | MANUFACTURERS OF ALL KINDS OF

Elliptic, Platform AND C Springs,

MADE EXCLUSIVELY FROM

SWEDISH STOCK, OIL-TEMPERED and WARRANTED.

Swedish Tire, Toe, Blister and Spring Steel.

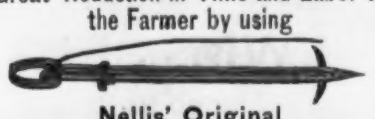
CAST SPRING AND PLOW STEEL.
CAST SHOVEL, HOE AND MACHINERY STEEL.

BESSEMER TOE, SLEIGH AND TIRE STEEL.
BESSEMER SHOVEL AND PLOW STEEL.
BESSEMER MACHINERY AND CULTIVATOR STEEL.

RE-ROLLED NORWAY SHAPES.
NORWAY NAIL RODS ROLLED AND SLIT FROM SUPERIOR BRANDS.

NEW TIME TABLE.

Great Reduction in Time and Labor to the Farmer by using



Nellis' Original
HARPOON HORSE HAY FORK,

Nellis' Grapple.

Grapple and Pulleys; also, Nellis' Patent Stacker and Method of conveying Hay, Straw, &c. A ton of Hay can be delivered in three to five minutes to any part of Mow or Stack. The right of Stacker and Conveyer granted FREE to the Farmer purchasing our Horse Hay Fork and Fixtures during season of 1875. With it Pulleys can be attached or detached to rafter or beam, without the use of a ladder.

NELLIS' PULLEY,

Improved Wrought Frame, Prepared Wood Wheel. Warranted superior to any Horse Fork Pulley offered in the market.

A trial of these goods will convince any farmer that he cannot afford to dispense with them, as their entire cost is often times saved by a single day's use. Also manufacturers of all descriptions

Of Agricultural Steel & Iron,

Steel Tempered by Nellis' process to suit every kind of soil.

Prices and descriptive Catalogues of our goods furnished free. Address,

A. J. NELLIS & CO.,
Pittsburgh, Pa.
SEMPLE, BIRGE & CO., St. Louis, Mo., General Agents for the Southwest.

ESTABLISHED 1840.

R. E. DIETZ,

No. 54 & 56 Fulton, and
29 & 31 Cliff Street, New York,

Manufacturer of the

Each mouse caught resets the Trap for another.

TUBULAR
And Other
Patent Lanterns
BRASS AND IRON
Jack Chains.

D. K. MILLER LOCK CO.,
712 Cherry St., Philadelphia, Pa.

Security, Durability, Convenience.

IMPROVED SELF-LOCKING
Brass Pad Locks.

Made in the most substantial and compact manner, and are in every respect a superior article. We guarantee that no two locks are alike, unless specially ordered. Each lock furnished with two keys. Any number of locks or keys made to order. Adopted by the United States Government. Samples of No. 1 Lock sent to all parts free, on receipt of $1·75. **Liberal Discounts to the Trade.**

GAS FIXTURES.

Lamps, Bronzes,

Equal to any made, in great variety, all of our own manufacture.

BRADLEY & HUBBARD MFG. CO.,
SALESROOMS:
21 & 23 Barclay, cor. Church St.,
NEW YORK.

HOISTING Machinery

Mfd. by
CRANE BROS MFG. CO.,
Chicago.

SARGEANT MFG. CO.,
Manufacturers of
Saddlery Hardware
In Gold, Silver, Nickel, Japanned, Lined, & X C.
Sole Manufacturers and Patentees of various Patented Improvements, including Gig Trees, "Imitation Covered Mountings," Wedge Buckles, &c., &c.
75, 77 & 79 Summit St., NEWARK, N. J.

Established 1827.

DIXON'S CRUCIBLES,
DIXON'S STOVE POLISH,
DIXON'S GRAPHITE PENCILS.

For Sale by the trade universally.

Joseph Dixon Crucible Co.,

ORESTES CLEVELAND, Prest.

JERSEY CITY, N. J.

Russell, Burdsall & Ward,

PORT CHESTER, N. Y.

Manufacturers of

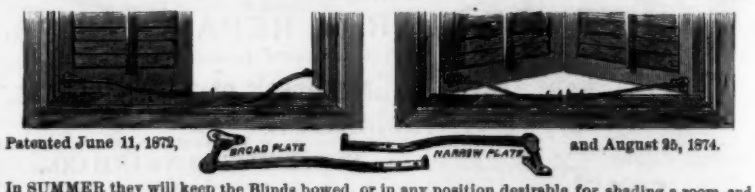
Carriage, Tire, Plow, Stove,
AND OTHER
BOLTS.

Carriage Bolts made from Best Square Iron, a Specialty.

THE "DOMESTIC" BLIND ADJUSTERS.

Hold the Blinds in any Position,

And Require No HOOKS OR CATCHES on the House.



Patented June 11, 1872, and August 25, 1874.

In SUMMER they will keep the Blinds bowed, or in any position desirable for shading a room, and in WINTER they enable them to be opened or closed *without reaching out of the window*, by simply raising the sash a few inches. **INVALUABLE FOR BAY WINDOWS.**

GRAY'S ADJUSTABLE BENCH CLAMP.

Easily Adjusted and Well Made.

Sizes	3	4½	6	8½	11 inches.
Per dozen	$4 00	5 00	6 00	7 00	8 00

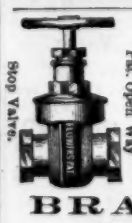
Manufactured by VAN WAGONER & WILLIAMS, 82 Beekman St., N. Y.

DERBY SILVER CO., Derby, Conn.,

Manufacture the most reliable

SILVER PLATED SPOONS & FORKS.

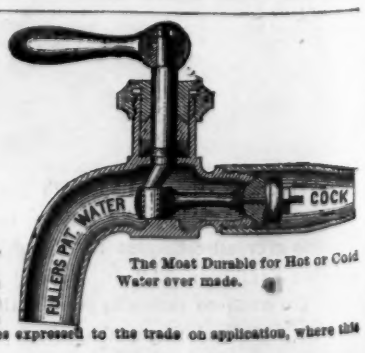
They are plated by weight, and not by time or guess, containing 20 per cent. more silver than the usual standard, on a base of Nickel Silver, and finished by hand. Each article is guaranteed by the trade mark and warranted to give full satisfaction. We ask of the trade a fair and impartial test, assuring them that the high standard already attained, shall be maintained. Send for Catalogue and Price.



Schofield's Pat. Gauge Cock.

HENRY C. MEYER & CO.,
Manufacturers of
BRASS WORK
For Water, Gas and Steam.
Importers and Dealers in PLUMBERS' MATERIALS,
46 & 48 Cliff Street, N. Y.

Specialties manufactured and controlled by us: Fuller's Patent Faucets and Mineral Water Cocks; Murdock Hydrants and Street Washers; Flower's Open Way Valves; Schofield's Gauge Cocks; Hall's Lock Gas Cocks. Illustrated Catalogues expressed to the trade on application, where this advertisement is referred to.



The Most Durable for Hot or Cold Water ever made.

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